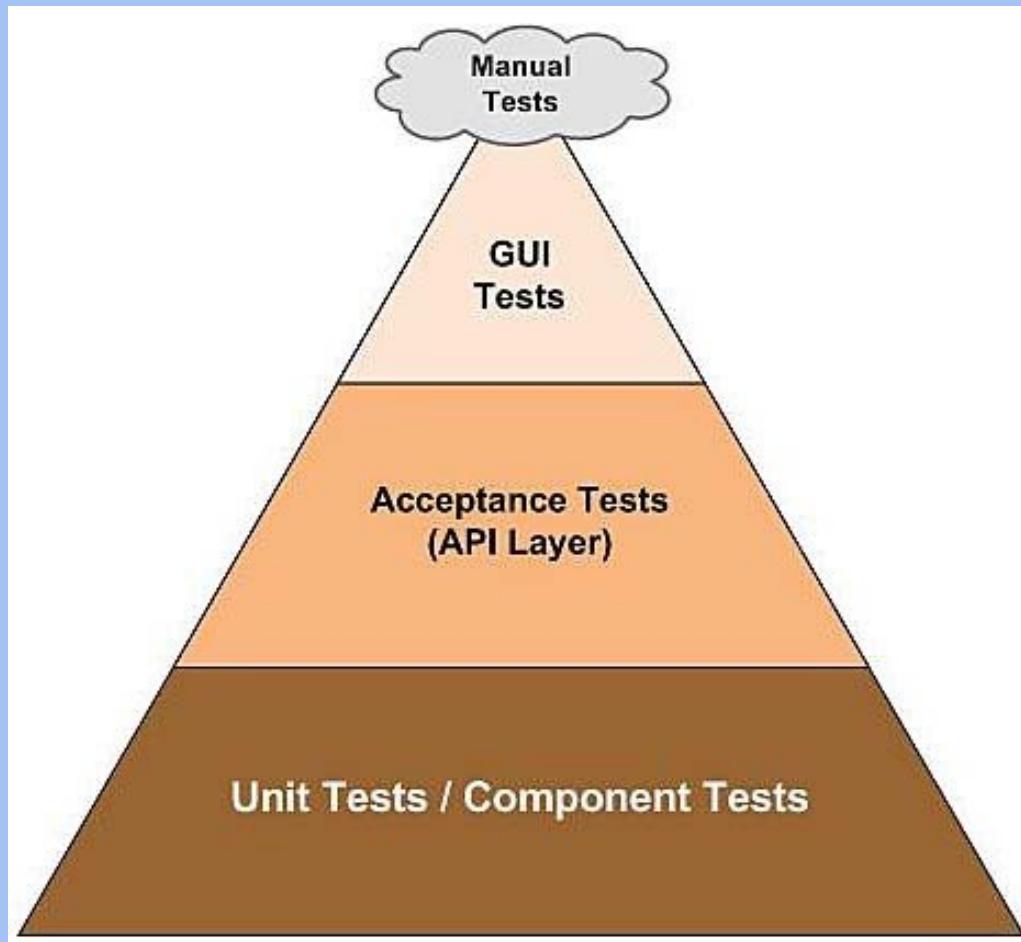


# **AGILE ANDROID WORKSHOP**

Godfrey Nolan



# ANDROID AGENDA

- Why??
- Unit, UI and API testing 101
- Calculator Example
- More Tools - FIRST
- ETA Detroit
- jUnit Testing
- Espresso
- Postman / Newman
- SonarQube
- Jenkins

# ANDROID AGENDA

Jenkins

search Admin | log out

ENABLE AUTO REFRESH

Back to Dashboard Status Changes Workspace Build Now Delete Project Configure GitHub SonarQube Coverage Trend

## Project ETAAndroid

SonarQube Workspace Recent Changes

### Code Coverage Trend

line covered line missed

enlarge

### SonarQube Quality Gate

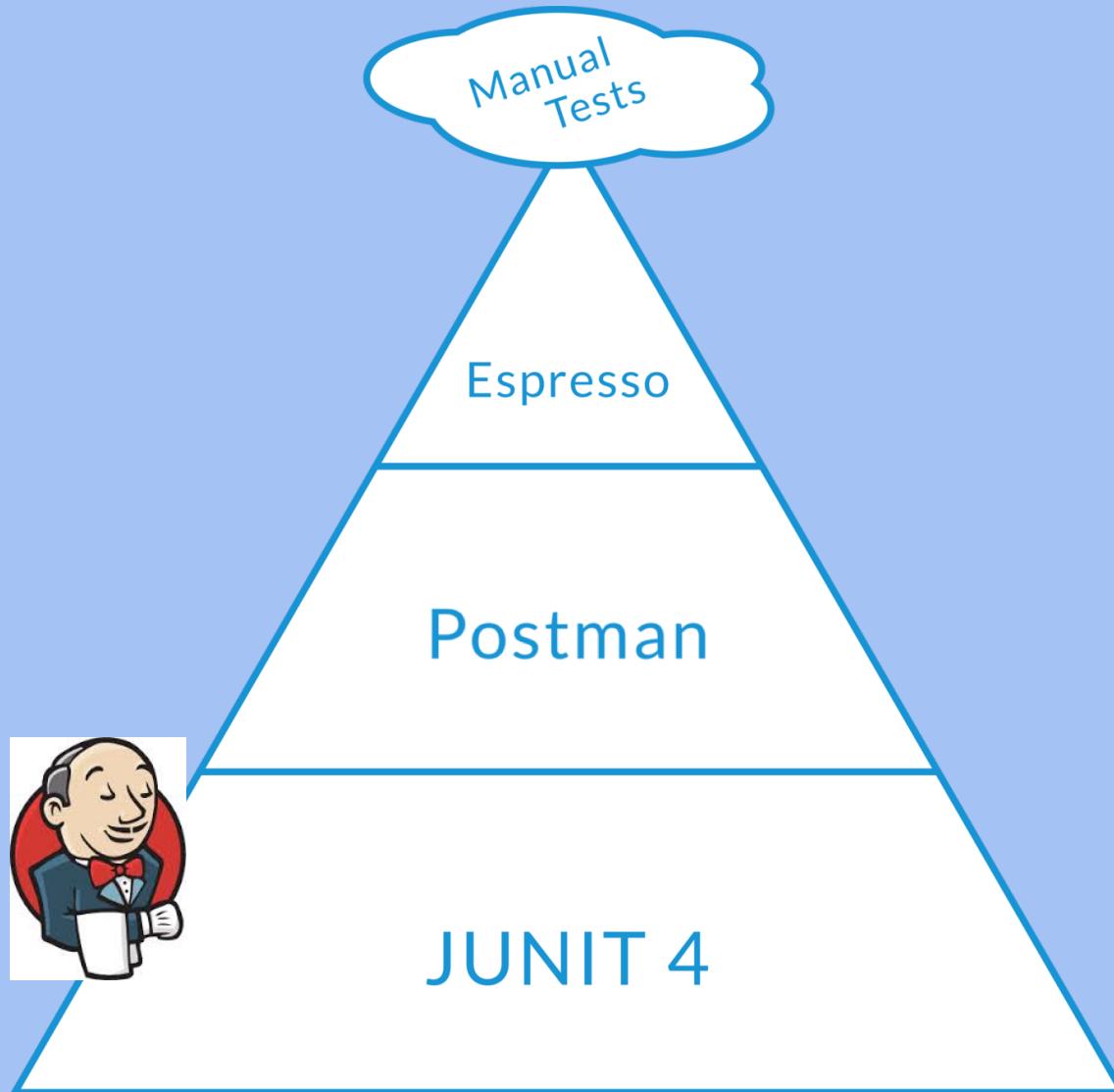
EtaAndroid OK server-side processing: Success

### Permalinks

- Last build (#12), 12 hr ago
- Last stable build (#12), 12 hr ago
- Last successful build (#12), 12 hr ago
- Last failed build (#11), 12 hr ago
- Last unsuccessful build (#11), 12 hr ago
- Last completed build (#12), 12 hr ago

DEMO

# ANDROID AGENDA



# **FOLLOW ALONG**

`git clone http://github.com/godfreynolan/CodeCraftsman`

# WHY

- Catch more mistakes
- Confidently make more changes
- Built in regression testing
- Extend the life of your codebase
- Better predictability and reliability

# LAB 1 - INSTALL JENKINS

1. Download the Jenkins Mac OS X native package from <http://jenkins-ci.org>.
2. Double click the .pkg file to install Jenkins.
3. Unlock Jenkins
4. Select Plugins to Install
5. Install plugins
6. Create First Admin User
7. Once done, your browser will open to <http://localhost:8080> where Jenkins lives.

# LAB 1 - INSTALL JENKINS

Getting Started

## Unlock Jenkins

To ensure Jenkins is securely set up by the administrator, a password has been written to the log ([not sure where to find it?](#)) and this file on the server:

`/Users/Shared/Jenkins/Home/secrets/initialAdminPassword`

Please copy the password from either location and paste it below.

Administrator password

Continue

# LAB 1 - INSTALL JENKINS

Getting Started



## Customize Jenkins

Plugins extend Jenkins with additional features to support many different needs.

### Install suggested plugins

Install plugins the Jenkins community finds most useful.

### Select plugins to install

Select and install plugins most suitable for your needs.

# LAB 1 - INSTALL JENKINS

## Getting Started

# Getting Started

✓ Folders Plugin	build timeout plugin	Credentials Binding Plugin	Timestamper	** bouncycastle API Plugin Folders Plugin ** Structs Plugin JUnit Plugin ** PAM Authentication plugin ** Windows Slaves Plugin ** Display URL API Jenkins Mailer Plugin ** LDAP Plugin ** Token Macro Plugin ** External Monitor Job Type Plugin ** Icon Shim Plugin ** Matrix Authorization Strategy Plugin ** OWASP Markup Formatter Plugin ** Script Security Plugin ** Matrix Project Plugin
Workspace Cleanup Plugin	Gradle Plugin	GitHub Organization Folder Plugin	Pipeline: Stage View Plugin	
Git plugin	SSH Slaves plugin	Email Extension Plugin	✓ Mailer Plugin	
✓ JUnit Plugin				** - required dependency

# LAB 1 - INSTALL JENKINS

Getting Started

## Create First Admin User

Username:

Password:

Confirm password:

Full name:

E-mail address:



# LAB 1 - INSTALL JENKINS

 Jenkins

Jenkins >

ENABLE AUTO REFRESH

New Item

People

Build History

Manage Jenkins

My Views

Credentials

Welcome to Jenkins!

Please [create new jobs](#) to get started.

Build Queue

No builds in the queue.

Build Executor Status

1 Idle

2 Idle

search

Admin | log out

[add description](#)

Page generated: Jun 6, 2017 2:37:31 PM EDT [REST API](#) [Jenkins ver. 2.46.3](#)

# LAB 1 - INSTALL JENKINS

① [www.cimgf.com/2015/05/26/setting-up-jenkins-ci-on-a-mac-2/](http://www.cimgf.com/2015/05/26/setting-up-jenkins-ci-on-a-mac-2/)

The screenshot shows a blog post titled "SETTING UP JENKINS CI ON A MAC" by Eric Cerney, dated May 26, 2015. The post includes a cartoon illustration of a character shouting "AUTOMATE ALL THE THINGS". The sidebar on the left lists various categories such as About, Cocoa Code Snippets, ZDS Code Style Guide, Categories, Advanced, Announcement, App Distribution, Apple, AppStore, Audio, Beginner, Blogging, Cocoa, Cocoa Touch, Coding Practice, Community, Continuous Integration, Core Animation, Core Data, Core Video, Development Environment, and Frameworks.

**SETTING UP JENKINS CI ON A MAC**  
by Eric Cerney

**26 MAY 2015**  
Continuous Integration

**AUTOMATE**  
**ALL THE THINGS**

Setting up a CI server can be nothing but pain and suffering, yet many of us take on this challenge to save time in the long run. Some things I would rather do than set up a CI server:

1. Get a root canal at my desk waiting for Xcode SourceKit crashes to calm down.
2. Submit an Apple Radar for one of my many Xcode crashes.
3. Write a tutorial on how to set up a Jenkins CI server. (Oh hey!)

Whether you're being a good developer and doing your unit testing, are tired of co-workers breaking your code, or have clients that can't live without the latest and greatest build, CI will be your new best friend and butler.

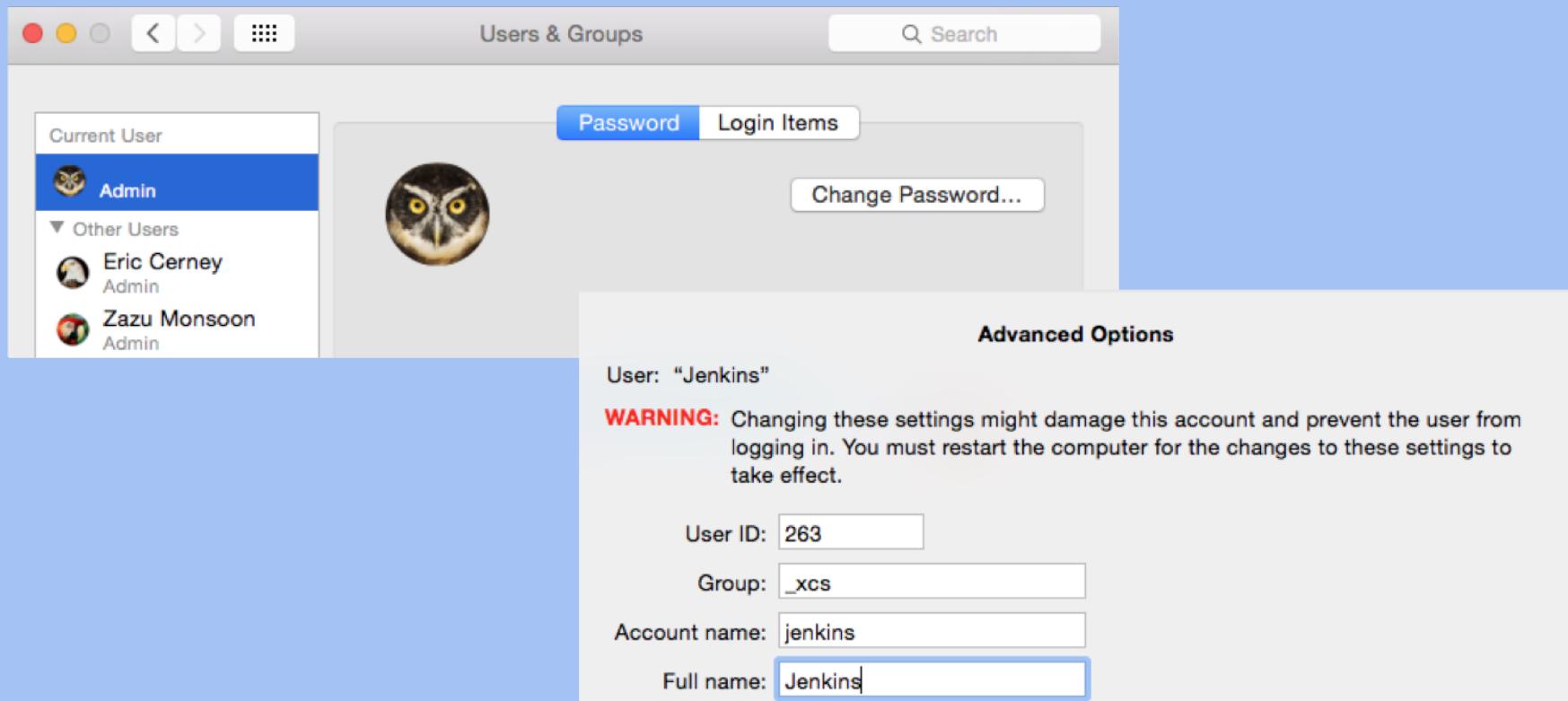
There are tons of posts floating around the internet with bits and pieces on this topic; but none were comprehensive enough for me to get a server up and running. Because of this, I decided to write a thorough guide that will walk you through setting up a [Jenkins CI Server](#) on your machine of choice. In this instance we used a Mac Mini.

Note that our end goal with Jenkins was to build, test, and distribute apps for both the iOS and Android platforms. Some of the setup in this guide is aimed at accomplishing this goal.

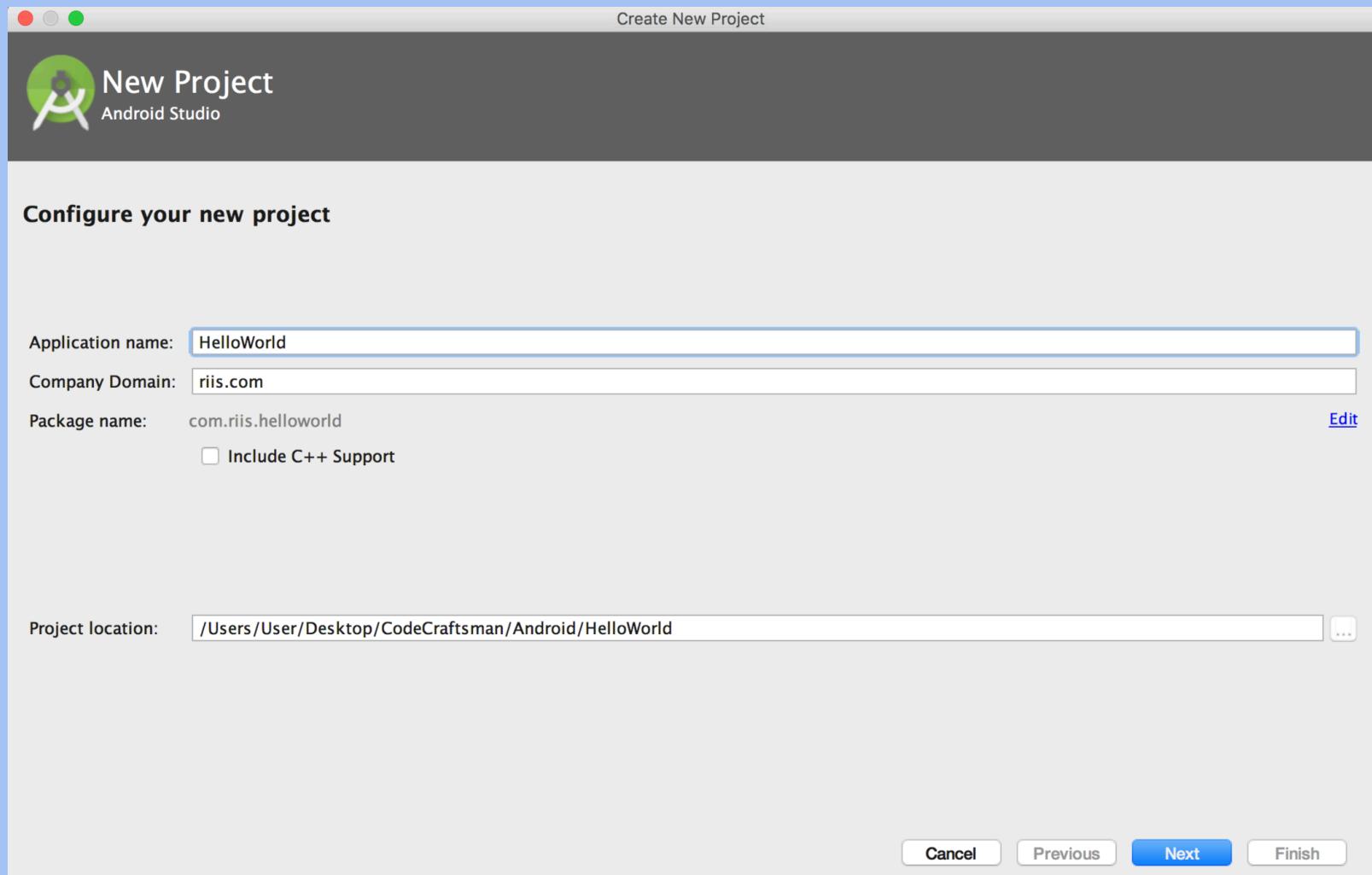
# LAB 1 - INSTALL JENKINS

1. Download the Jenkins Mac OS X native package from <http://jenkins-ci.org>.
2. Double click the .pkg file to install Jenkins.
3. Once done, your browser will open to <http://localhost:8080> where Jenkins lives.
4. Make the Jenkins user an admin:  
`sudo dseditgroup -o edit -a jenkins -t user admin`
5. Add the Jenkins user to the developer group:  
`sudo dscl . append /Groups/_developer GroupMembership jenkins`
6. Make the Jenkins user automatically login when the computer is restarted
7. unload Jenkins as a Daemon:  
`sudo launchctl unload /Library/LaunchDaemons/org.jenkins-ci.plist`
8. move the .plist file, which defines how Jenkins will run, to the LaunchAgents folder:  
`sudo mv /Library/LaunchDaemons/org.jenkins-ci.plist /Library/LaunchAgents/`
9. Edit the plist file:  
`sudo vim /Library/LaunchAgents/org.jenkins-ci.plist`  
`/* Remove the following lines */`  
`<key>SessionCreate</key>`  
`<true />`
10. reload the Launch Agent to restart Jenkins:  
`sudo launchctl load /Library/LaunchAgents/org.jenkins-ci.plist`
11. Set up the Jenkins user

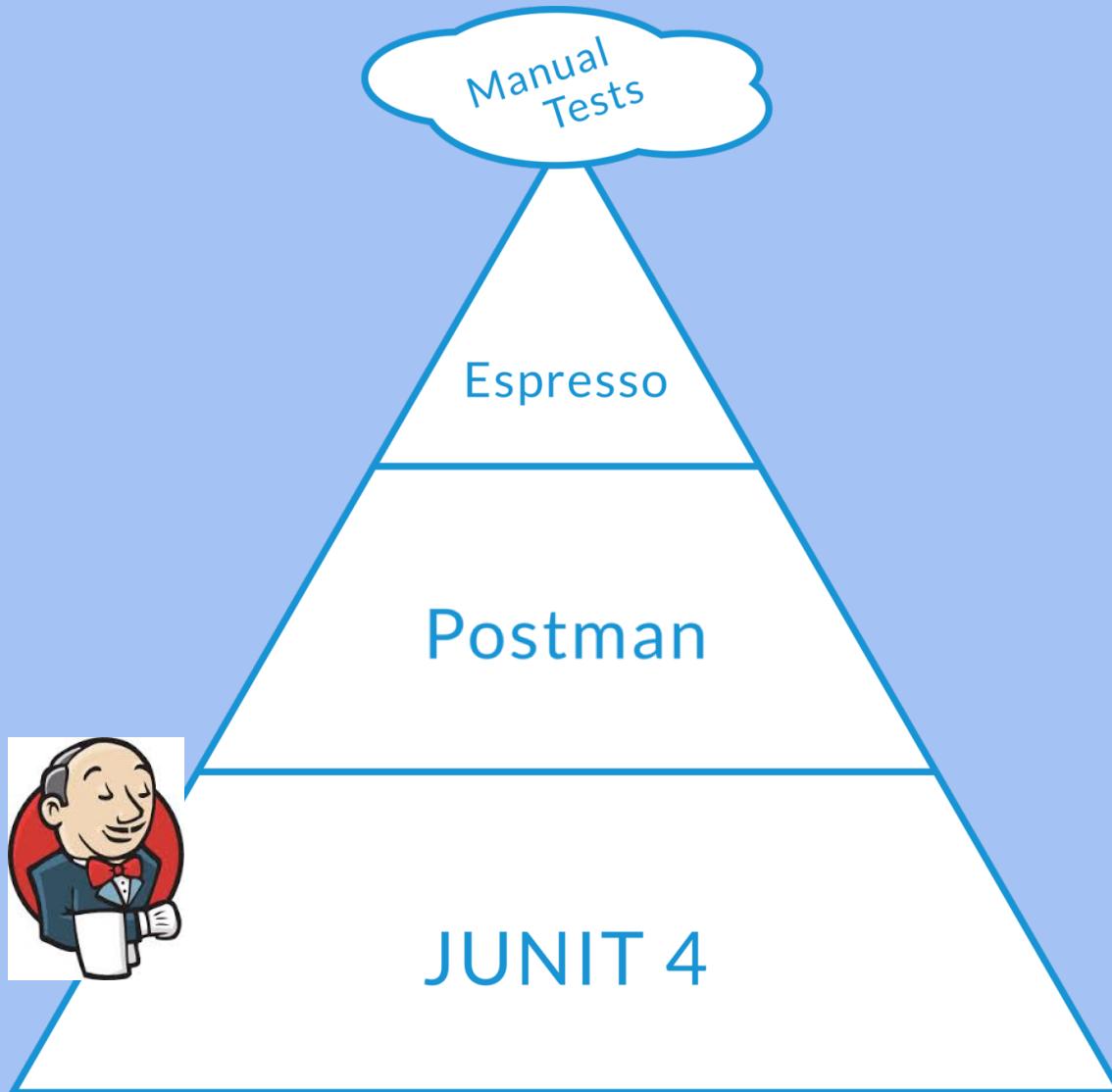
# LAB 1 - INSTALL JENKINS



# LAB 2 - INSTALL ANDROID STUDIO



# ANDROID AGENDA



# UNIT TESTING INTRO

```
public double add(double firstOperand, double secondOperand) {  
    return firstOperand + secondOperand;  
}  
  
@Test  
public void calculator_CorrectAdd_ReturnsTrue() {  
    assertEquals(7, add(3,4));  
}  
  
@Test  
public void calculator_CorrectAdd_ReturnsTrue() {  
    assertEquals("Addition is broken", 7, add(3,4));  
}
```

```
dependencies {  
    // Unit testing dependencies.  
    testCompile 'junit:junit:4.12'  
}
```

CalculatorAdd - [C:\Users\godfrey\AndroidStudioProjects\CalculatorAdd] - [app] - ...\\app\\src\\main\\java\\com\\riis\\calculatoradd\\CalculatorAddActivity.java - Android S... □ X

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help

CalculatorTest ▶

CalculatorAdd app src test java com riis calculatoradd CalculatorTest

CalculatorAddActivity.java

Android

Captures

Project

Structure

Build Variants

Test Artifact: Unit Tests

Module Build Variant

app debug

DEM0

```
@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_calculator_add);
    mCalculator = new Calculator();
    mResultTextView = (TextView) findViewById(R.id.operation_result_text_view);
    mOperandOneEditText = (EditText) findViewById(R.id.operand_one_edit_text);
    mOperandTwoEditText = (EditText) findViewById(R.id.operand_two_edit_text);
}

/**
 * onClick method that is called when the add (@Link Button) is pressed.
 */
public void onClick(AddView view) {
    calculate(Calculator.Operator.ADD);
}

private void calculate(Calculator.Operator operator) {
    double operandOne;
    double operandTwo;
    try {
        operandOne = getOperand(mOperandOneEditText);
        operandTwo = getOperand(mOperandTwoEditText);
    } catch (NumberFormatException e) {
        e.printStackTrace();
    }
    double result = mCalculator.compute(operator, operandOne, operandTwo);
    mResultTextView.setText(String.valueOf(result));
}
```

Run CalculatorTest

Done: 1 of 1 (in 0.032 s)

C:\Java\jdk\bin\java ...

Process finished with exit code 0

Test Time elapsed Usage Delta Usage Before Usage After Results

Test	Time elapsed	Usage Delta	Usage Before	Usage After	Results
calculator_Cor...	0.004 s	0 Kb	7,321 Kb	7,321 Kb	Passed

Tests Passed: 1 passed  
Total time: 0.004 s

Event Log Gradle Console

Build Variants

Terminal Messages Android Monitor Run TODO

Tests Passed: 1 passed in 0.032 s (moments ago)

# UNIT TESTING 101

- Command line
- Setup and Teardown
- Assertions
- Parameters
- Code Coverage



```
public class CalculatorTest {  
  
    private Calculator mCalculator;  
  
    @Before  
    public void setUp() {  
        mCalculator = new Calculator();  
    }  
  
    @Test  
    public void calculator_CorrectAdd_ReturnsTrue() {  
        double resultAdd = mCalculator.add(3, 4);  
        assertEquals(7, resultAdd, 0);  
    }  
  
    @After  
    public void tearDown() {  
        mCalculator = null;  
    }  
}
```

# UNIT TESTING 101

- assertEquals
- assertTrue
- assertFalse
- assertNull
- assertNotNull
- assertSame
- assertNotSame
- assertThat
- fail

```
@RunWith(Parameterized.class)
public class CalculatorParamTest {

    private int mOperandOne, mOperandTwo, mExpectedResult;
    private Calculator mCalculator;

    @Parameters
    public static Collection<Object[]> data() {
        return Arrays.asList(new Object[][] {
            {3, 4, 7}, {4, 3, 7}, {8, 2, 10}, {-1, 4, 3}, {3256, 4, 3260}
        });
    }

    public CalculatorParamTest(int mOperandOne, int mOperandTwo, int mExpectedResult) {
        this.mOperandOne = mOperandOne;
        this.mOperandTwo = mOperandTwo;
        this.mExpectedResult = mExpectedResult;
    }

    @Before
    public void setUp() { mCalculator = new Calculator(); }

    @Test
    public void testAdd_TwoNumbers() {
        int resultAdd = mCalculator.add(mOperandOne, mOperandTwo);
        assertEquals(mExpectedResult, resultAdd, 0);
    }
}
```

```
/*
 * A simple calculator with a basic set of operations.
 */
public class Calculator {

    public enum Operator {ADD, SUB, DIV, MUL}

    /**
     * Addition operation
     */
    public double add(double firstOperand, double secondOperand) {
        return firstOperand + secondOperand;
    }

    /**
     * Subtract operation
     */
    public double sub(double firstOperand, double secondOperand) {
        return firstOperand - secondOperand;
    }

    /**
     * Divide operation
     */
    public double div(double firstOperand, double secondOperand) {
        // checkArgument(secondOperand != 0, "secondOperand must be != 0, you
        return firstOperand / secondOperand;
    }

    /**
     * Multiply operation
     */
    public double mul(double firstOperand, double secondOperand) {
        return firstOperand * secondOperand;
    }
}
```

CalculatorAdd - [C:\Users\godfrey\AndroidStudioProjects\CalculatorAdd] - [app] - ...\\app\\src\\main\\java\\com\\riis\\calculatoradd\\CalculatorAddActivity.java - Android S... □ X

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help

CalculatorTest ▶

CalculatorAdd app src test java com riis calculatoradd CalculatorTest

CalculatorAddActivity.java

Android

Captures

Project

Structure

Build Variants

Test Artifact: Unit Tests

Module Build Variant

app debug

DEM0

```
@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_calculator_add);
    mCalculator = new Calculator();
    mResultTextView = (TextView) findViewById(R.id.operation_result_text_view);
    mOperandOneEditText = (EditText) findViewById(R.id.operand_one_edit_text);
    mOperandTwoEditText = (EditText) findViewById(R.id.operand_two_edit_text);
}

/**
 * onClick method that is called when the add (@Link Button) is pressed.
 */
public void onClick(AddView view) {
    calculate(Calculator.Operator.ADD);
}

private void calculate(Calculator.Operator operator) {
    double operandOne;
    double operandTwo;
    try {
        operandOne = getOperand(mOperandOneEditText);
        operandTwo = getOperand(mOperandTwoEditText);
    } catch (NumberFormatException e) {
        e.printStackTrace();
    }
    double result = mCalculator.compute(operator, operandOne, operandTwo);
    mResultTextView.setText(String.valueOf(result));
}
```

Run CalculatorTest

Done: 1 of 1 (in 0.032 s)

CalculatorTest (com.riis.calculatoradd) All Tests Passed

C:\Java\jdk\bin\java ...

Process finished with exit code 0

Test Time elapsed Usage Delta Usage Before Usage After Results

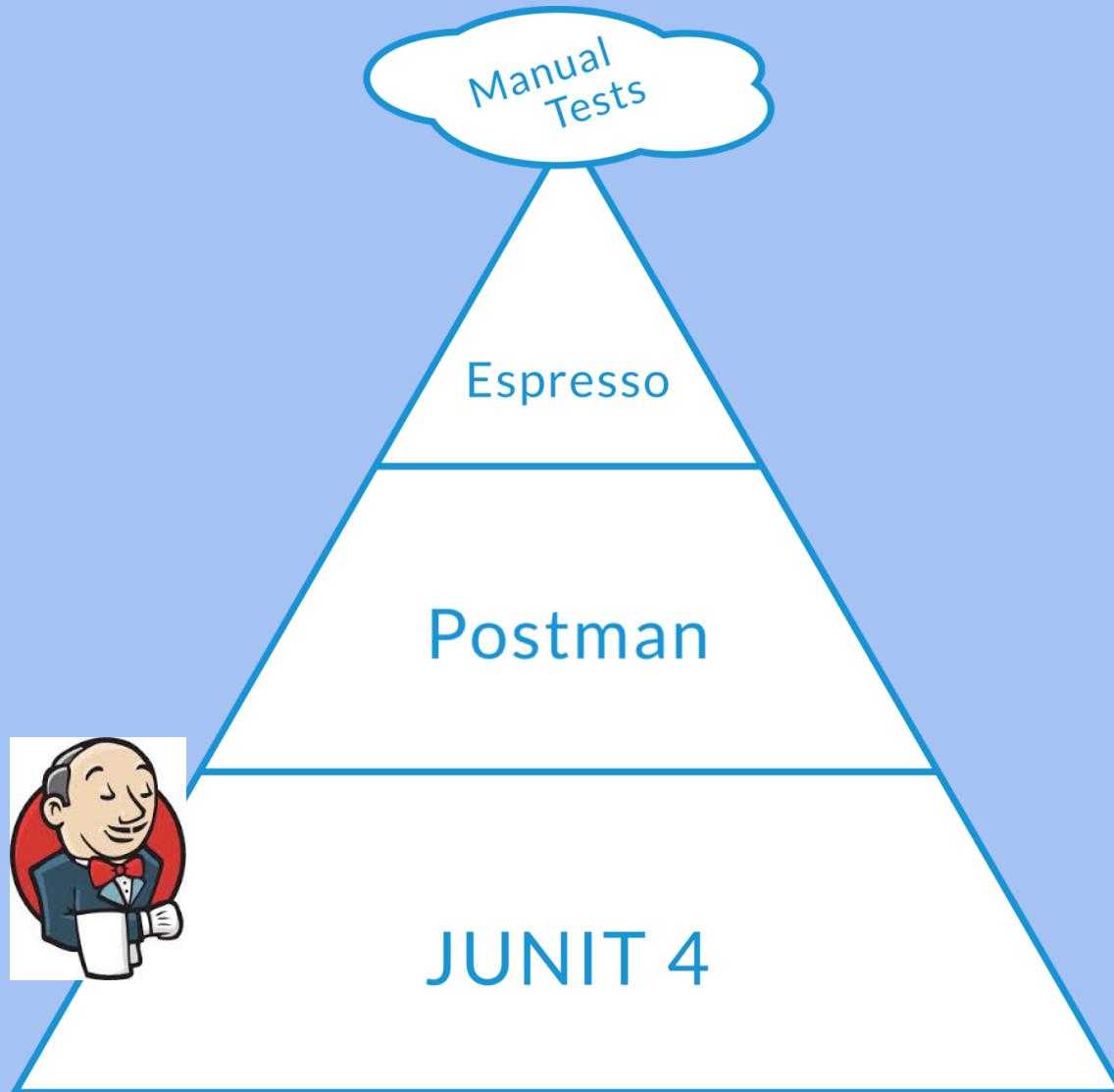
Test	Time elapsed	Usage Delta	Usage Before	Usage After	Results
calculator_Cor...	0.004 s	0 Kb	7,321 Kb	7,321 Kb	Passed

Tests Passed: 1 passed  
Total time: 0.004 s

Event Log Gradle Console

Tests Passed: 1 passed in 0.032 s (moments ago)

# ANDROID AGENDA



Postman

Runner Import +

Builder Team Library IN SYNC Godfrey N... No Environment Filter

History Collections All Me Team

ETAjson 1 request

GET http://ec2-204-236-211-33.compute-1.amazonaws.com:8080/companies/1/routes/1/Northbound/weekday/1/stops

Authorization Headers Body Pre-request Script Tests ● Cookies Code

```
1 tests["Body has stopID"] = responseBody.has("stopID");
2 tests["Body has stopName"] = responseBody.has("stopName");
3 tests["Body has latitude"] = responseBody.has("latitude");
4 tests["Body has longitude"] = responseBody.has("longitude");
5
6 var jsonData = JSON.parse(responseBody);
7
8 tests["The first stopID equals String 22362"] = jsonData[0].stopID === "22362";
9 tests["The first stopName equals String METRO AIRPORT McNAMARA TERMINAL"] = jsonData[0]
  .stopName === "METRO AIRPORT McNAMARA TERMINAL";
10 tests["The first order equals String 1"] = jsonData[0].order === 1;
```

SNIPPETS

- Clear a global variable
- Clear an environment variable
- Response body: Contains string
- Response body: Convert XML body to a JSON Object
- Response body: Is equal to a string
- Response body: JSON value check
- Response headers: Content-Type header check
- Response time is less than 200ms
- Set a global variable

Body Cookies Headers (5) Tests (7/7)

Status: 200 OK Time: 105 ms Size: 1.74 KB

All Passed Failed

PASS Body has latitude

PASS Body has longitude

PASS Body has stopID

PASS Body has stopName

# LAB 3 - INSTALL POSTMAN

1. Download Postman from <http://getpostman.com>
2. Run Postman
3. Import the ETATJson.postman\_collection.json
4. Run the tests

# ESPRESSO

- GUI Testing
- OnView
- OnData
- gradlew connectedCheck



**onView(ViewMatcher)**

```
.perform(ViewAction)
.check(ViewAssertion);
```

### View Matchers

- USER PROPERTIES**
  - withId(...)
  - withText(...)
  - withTag(...)
  - withTagValue(...)
  - hasDescendant(...)
  - withContentDescription(...)
  - withInt(...)
  - withLongText(...)
  - hasLinks()
  - hasEllipsizeText()
  - hasMultiLineText()
- UI PROPERTIES**
  - isClickable()
  - isCompleteDisplayed()
  - isEnabled()
  - hasFocus()
  - isClickable()
  - isChecked()
  - isFocused()
  - isSelectableVisibility(...)
  - isSelected()
- OBJECT MATCHER**
  - allOf(Matcher)
  - anyOf(Matcher)
  - is(...)
  - not(...)
  - endsWith(String)
  - startsWith(String)
  - instanceOf(Class)
- SEE ALSO**
  - Preference matchers
  - Color matchers
  - Layout matchers

**onData(ObjectMatcher)**

```
.DataOptions
.perform(ViewAction)
.check(ViewAssertion);
```

### Data Options

- HIERARCHY**
  - withParent(Matcher)
  - withChild(Matcher)
  - isAncestorOf(Matcher)
  - isDescendantOf(Matcher)
  - hasSibling(Matcher)
  - isRoot()
- INPUT**
  - supportsInputMethods(...)
  - hasEditAction(...)
- CLASS**
  - isAssignableFrom(...)
  - withClassName(...)
- ROOT MATCHERS**
  - isFocusable()
  - isLarge()
  - isDialog()
  - withNoCornerRadius()
  - isPlatformPopup()
- SEE ALSO**
  - Preference matchers
  - Color matchers
  - Layout matchers

**intended(IntentMatcher);**

**intending(IntentMatcher)**

```
.respondWith(ActivityResult);
```

### Intent Matchers

- INTENT**
  - hasAction(...)
  - hasCategories(...)
  - hasData(...)
  - hasExtra(...)
  - hasExtra(...)
  - hasExtra(...)
  - hasExtra(...)
  - hasExtra(...)
  - hasType(...)
  - hasPacks(...)
  - toPackage(...)
  - hasFlag(int)
  - hasFlag(int)
  - isInternal()
- URI**
  - hasHost(...)
  - hasParamByName(...)
  - hasPath(...)
  - hasQueryValue(...)
  - hasScheme(...)
  - hasSchemeSpecificPart(...)
- BUNDLE**
  - hasEntry(...)
  - hasKey(...)
  - hasValue(...)
- COMPONENT NAME**
  - hasClassName(...)
  - hasPackageName(...)
  - hasInternalName(...)
  - hasPackageName(...)

**View Actions**

- CLICK/PRESS**
  - click()
  - doubleClick()
  - longClick()
  - pressBack()
  - pressEnterOnButton()
  - pressEscKey()
  - pressHomeKey()
  - closeSoftKeyboard()
  - openLink()
- GESTURES**
  - scroll(...)
  - swipe(...)
  - swipeRight()
  - swipeUp()
  - swipeDown()
- TEXT**
  - clearText()
  - typeText(\$String)
  - typeTextInfoFocusedView(\$String)
  - replaceText(\$String)

**View Assertions**

- POSITION ASSERTIONS**
  - isLeftOf(Matcher)
  - isLeftOf(Matcher)
  - isLeftAlignedWith(Matcher)
  - isRightAlignedWith(Matcher)
  - isAbove(Matcher)
  - isBelow(Matcher)
  - isBottomAlignedWith(Matcher)
  - isTopAlignedWith(Matcher)
- LAYOUT ASSERTIONS**
  - noEllipsisText(Matcher)
  - noNullChildren()
  - noOverlaps([Matcher])


 CHEAT SHEET  
 espresso 2.1

v2.1.0, 4/21/2015

CalculatorAdd - [C:\Users\godfrey\AndroidStudioProjects\CalculatorAdd] - [app] - ...\\app\\src\\main\\java\\com\\riis\\calculatoradd\\CalculatorAddActivity.java - Android S... □ X

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help

CalculatorTest ▶

CalculatorAdd app src test java com riis calculatoradd CalculatorTest

CalculatorAddActivity.java

Android

Captures

Project

Structure

Build Variants

Test Artifact: Unit Tests

Module Build Variant

app debug

DEM0

```
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}

private void calculate(Calculator.Operator operator) {
    double operandOne;
    double operandTwo;
    try {
        operandOne = getOperand(mOperandOneEditText);
        operandTwo = getOperand(mOperandTwoEditText);
    } catch (NumberFormatException e) {
        e.printStackTrace();
    }
    double result = mCalculator.compute(operator, operandOne, operandTwo);
    mResultTextView.setText(String.valueOf(result));
}
```

Run CalculatorTest

Done: 1 of 1 (in 0.032 s)

CalculatorTest (com.riis.calculatoradd) All Tests Passed

C:\Java\jdk\bin\java ...

Process finished with exit code 0

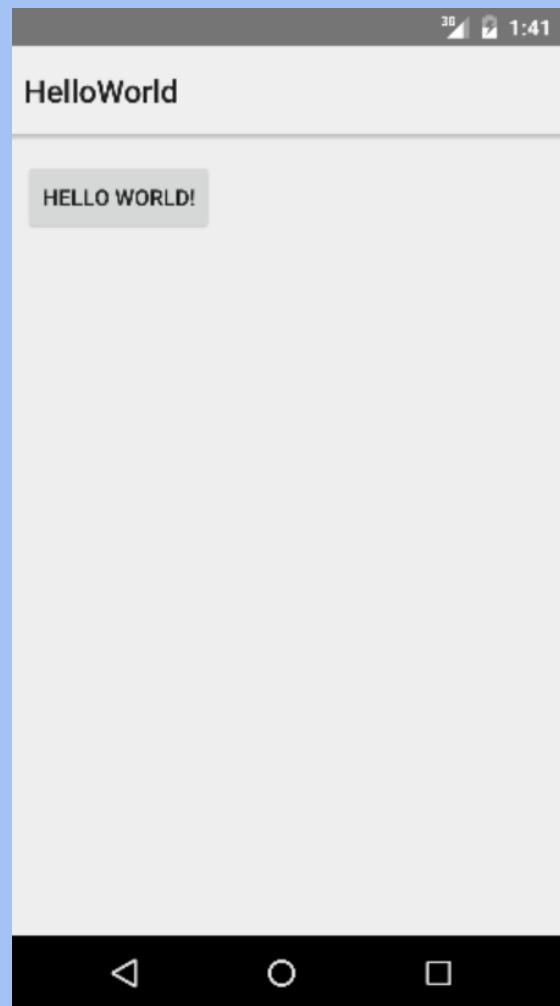
Test Time elapsed Usage Delta Usage Before Usage After Results

Test	Time elapsed	Usage Delta	Usage Before	Usage After	Results
calculator_Cor...	0.004 s	0 Kb	7,321 Kb	7,321 Kb	Passed

Tests Passed: 1 passed  
Total time: 0.004 s

Event Log Gradle Console

Tests Passed: 1 passed in 0.032 s (moments ago)



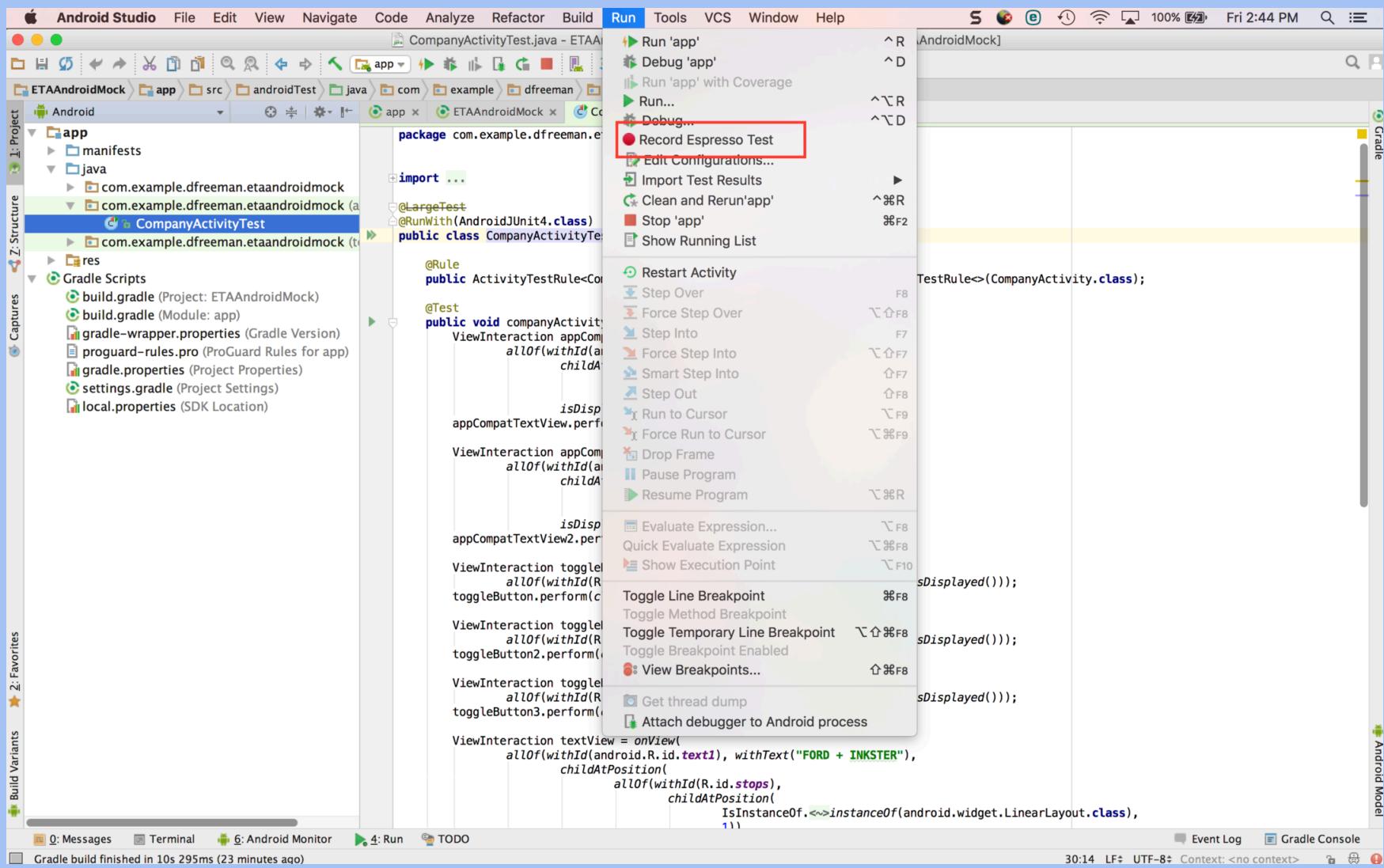
```
@RunWith(AndroidJUnit4.class)
@LargeTest
public class MainActivityTest {

    @Rule
    public ActivityTestRule<MainActivity> activityTestRule =
            new ActivityTestRule<>(MainActivity.class);
    @Test
    public void helloWorldTest() {
        onView(withId(R.id.hello_world))
                .check(matches(withText(R.string.hello_world)));
    }
}
```

```
@Test
public void helloWorldButtonTest(){

    onView(withId(R.id.button))
            .perform(click())
            .check(matches(isEnabled()));
}
```

# LAB 4 - RECORD ESPRESSO



# MORE TOOLS - BUT WHY??

- F(ast)
- I(solated)
- R(epetatable)
- S(elf-verifying)
- T(imely) i.e. TDD not TAD

Feature	Small	Medium	Large
Network access	No	localhost only	Yes
Database	No	Yes	Yes
File system access	No	Yes	Yes
Use external systems	No	Discouraged	Yes
Multiple threads	No	Yes	Yes
Sleep statements	No	Yes	Yes
System properties	No	Yes	Yes
Time limit (seconds)	60	300	900+

# MOCKITO TEMPLATE

```
@Test
public void test() throws Exception {

    // Arrange, prepare behavior
    Helper aMock = mock(Helper.class);
    when(aMock.isCalled()).thenReturn(true);

    // Act
    testee.doSomething(aMock);

    // Assert - verify interactions
    verify(aMock).isCalled();

}
```

```
when(methodIsCalled).thenReturn(aValue);
```

## Enter an item name

HelloWorld

» Required field



### Freestyle project

This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.



### Pipeline

Orchestrates long-running activities that can span multiple build slaves. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.



### External Job

This type of job allows you to record the execution of a process run outside Jenkins, even on a remote machine. This is designed so that you can use Jenkins as a dashboard of your existing automation system.



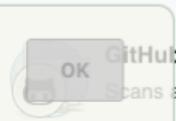
### Multi-configuration project

Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds, etc.



### Folder

Creates a container that stores nested items in it. Useful for grouping things together. Unlike view, which is just a filter, a folder creates a separate namespace, so you can have multiple things of the same name as long as they are in different folders.



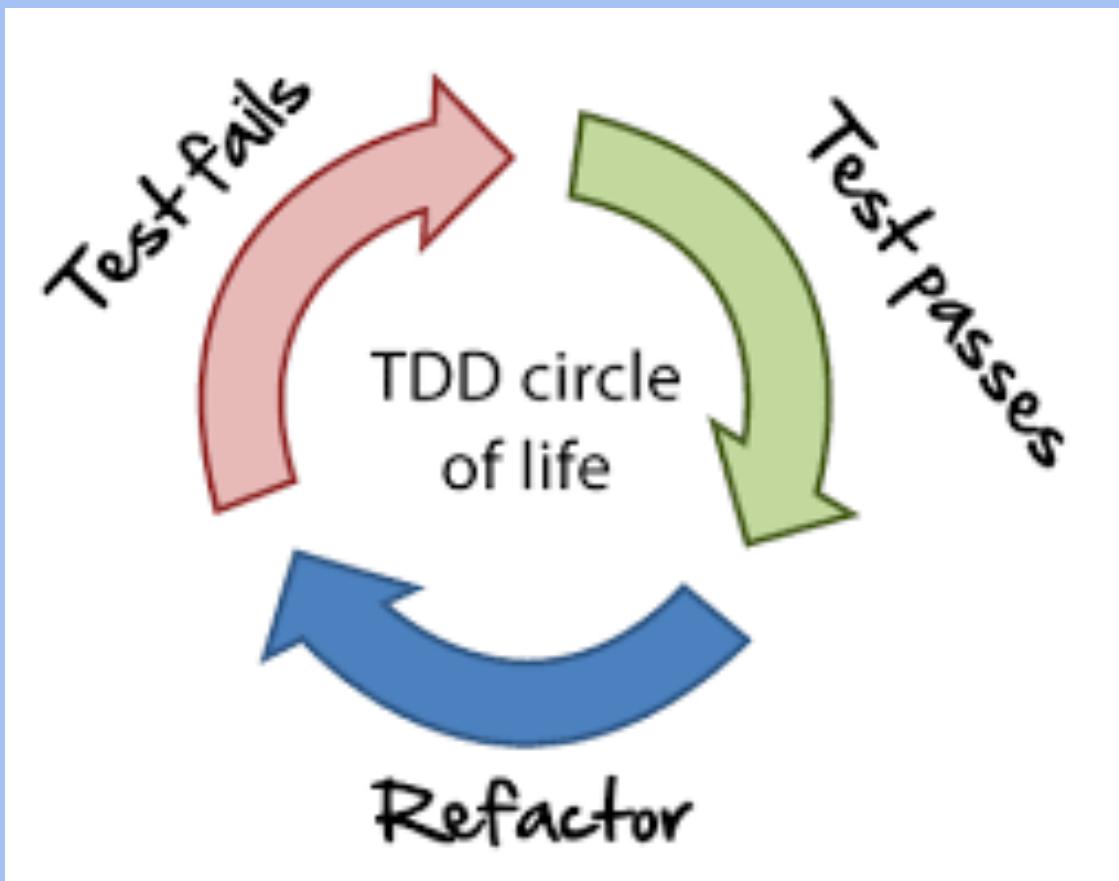
### GitHub Organization

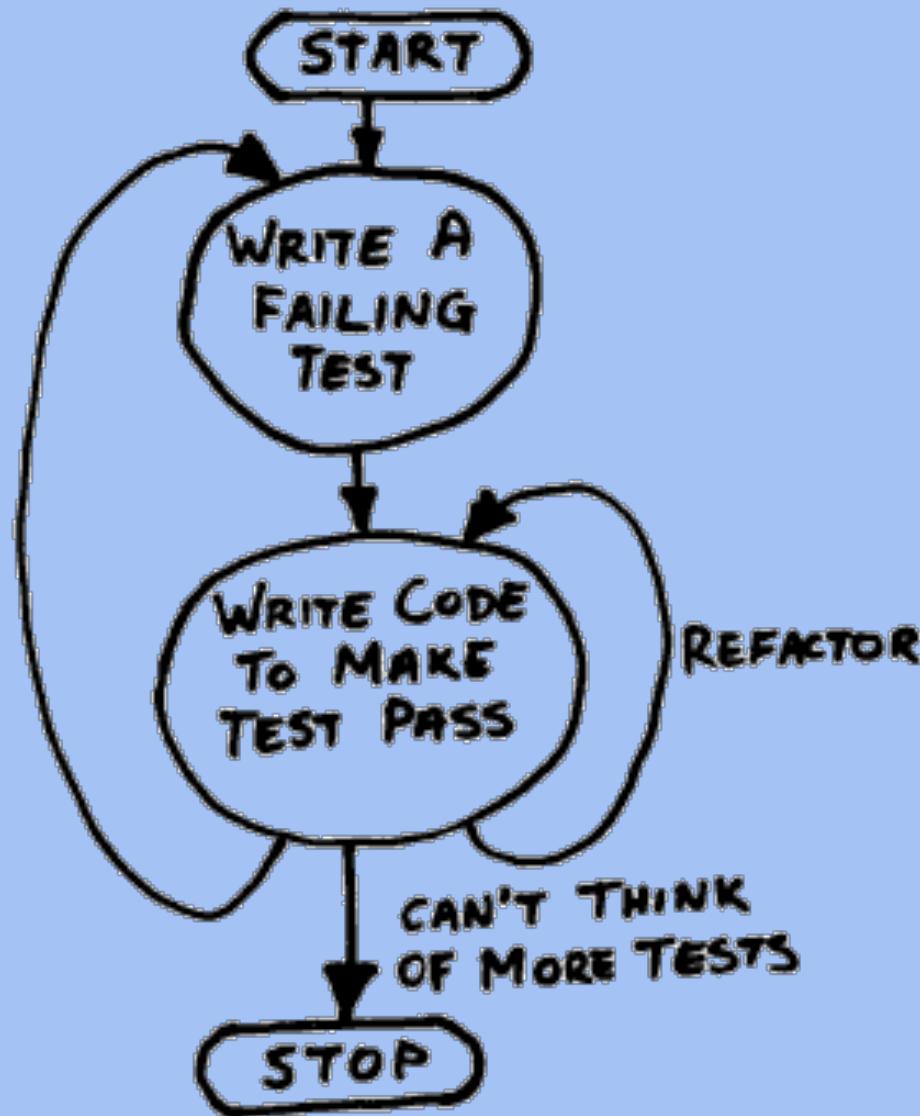
Scans a GitHub organization (or user account) for all repositories matching some defined markers.

Coverage CalculatorTest

7% classes, 10% lines covered in package 'com.riis.calculatordiv'

Element	Class, %	Method, %	Line, %
BuildConfig	0% (0/1)	0% (0/1)	0% (0/2)
Calculator	50% (1/2)	80% (4/5)	85% (6/7)
CalculatorDivActivity	0% (0/2)	0% (0/6)	0% (0/37)
R	0% (0/8)	0% (0/0)	0% (0/9)





CalculatorAdd - [C:\Users\godfrey\AndroidStudioProjects\CalculatorAdd] - [app] - ...\\app\\src\\main\\java\\com\\riis\\calculatoradd\\CalculatorAddActivity.java - Android S... -

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help

CalculatorTest

CalculatorAdd app src test java com riis calculatoradd CalculatorTest

CalculatorAddActivity.java

```
@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_calculator_add);
    mCalculator = new Calculator();
    mResultTextView = (TextView) findViewById(R.id.operation_result_text_view);
    mOperandOneEditText = (EditText) findViewById(R.id.operand_one_edit_text);
    mOperandTwoEditText = (EditText) findViewById(R.id.operand_two_edit_text);
}

/**
 * onClick method that is called when the add (@Link Button) is pressed.
 */
public void onClick(AddView view) {
    calculate(Calculator.Operator.ADD);
}

private void calculate(Calculator.Operator operator) {
    double operandOne;
    double operandTwo;
    try {
        operandOne = getOperand(mOperandOneEditText);
        operandTwo = getOperand(mOperandTwoEditText);
        mResultTextView.setText(String.valueOf(mCalculator.compute(operator, operandOne, operandTwo)));
    } catch (Exception e) {
        mResultTextView.setText("Error");
    }
}
```

DEM0

Run CalculatorTest

Done: 1 of 1 (in 0.032 s)

C:\Java\jdk\bin\java ...  
Process finished with exit code 0

Test Time elapsed Usage Delta Usage Before Usage After Results  
calculator\_Cor 0.004 s 0 Kb 7,321 Kb 7,321 Kb Passed

Tests Passed: 1 passed  
Total time: 0.004 s

Event Log Gradle Console

Tests Passed: 1 passed in 0.032 s (moments ago)

# LAB 5 - HELLO WORLD JENKINS

General      Source Code Management      Build Triggers      Build Environment      Build      Post-build Actions

Project name

Description

[Plain text] [Preview](#)

Discard old builds      [?](#)

GitHub project      [?](#)

Project url  [Advanced...](#) [?](#)

This project is parameterized      [?](#)

Throttle builds      [?](#)

Disable this project      [?](#)

Execute concurrent builds if necessary      [?](#)

[Advanced...](#)

Source Code Management

None

# LAB 5 - HELLO WORLD JENKINS

General    **Source Code Management**    Build Triggers    Build Environment    Build    Post-build Actions

## Source Code Management

None  
 Git

**Repositories**

Repository URL	<input type="text" value="https://github.com/gnolanltu/HelloWorld/"/>	<a href="#">?</a>
Credentials	<input type="button" value="- none -"/>	<a href="#">Add</a>
<a href="#">Advanced...</a>		
<a href="#">Add Repository</a>		

**Branches to build**

Branch Specifier (blank for 'any')	<input type="text" value="*/master"/>	<a href="#">X</a>	<a href="#">?</a>
<a href="#">Add Branch</a>			

**Repository browser**    (Auto)

**Additional Behaviours**    [Add](#)

Subversion

[Save](#)    [Apply](#)

Trigger builds remotely (from scripts) from scripts)

# LAB 5 - HELLO WORLD JENKINS

General    Source Code Management    Build Triggers    Build Environment    **Build**    Post-build Actions

## Build

Invoke Gradle script  
 Invoke Gradle  
 Use Gradle Wrapper

Make gradlew executable

From Root Build Script Dir

Build step description

Switches

Tasks

Root Build script

Build File

Specify Gradle build file to run. Also, [some environment variables are available to the build script](#)

Force GRADLE\_USER\_HOME to use workspace

Pass job parameters as  Gradle properties

**Save** **Apply**

# LAB 5 - HELLO WORLD JENKINS

Jenkins

search Godfrey Nolan log ENABLE AUTO REFRESH

Back to Dashboard Status Changes Workspace Build Now Delete Project Configure Move GitHub

## Project HelloWorld

Workspace Recent Changes

### Permalinks

- Last build (#6), 4 min 22 sec ago
- Last stable build (#6), 4 min 22 sec ago
- Last successful build (#6), 4 min 22 sec ago
- Last failed build (#4), 12 min ago
- Last unsuccessful build (#4), 12 min ago
- Last completed build (#6), 4 min 22 sec ago

Build History trend →

build	date
#6	Nov 15, 2016 4:33 PM
#5	Nov 15, 2016 4:33 PM
#4	Nov 15, 2016 4:25 PM
#3	Nov 15, 2016 4:12 PM
#2	Nov 15, 2016 4:11 PM
#1	Nov 15, 2016 4:10 PM

RSS for all RSS for failures

add description Disable Project

# LAB 5 - HELLO WORLD JENKINS

Jenkins

search Godfrey Nolan | log out

Jenkins > HelloWorld > #6

Back to Project Status Changes Console Output View as plain text Edit Build Information Delete Build Git Build Data No Tags Previous Build

Executed Gradle Tasks

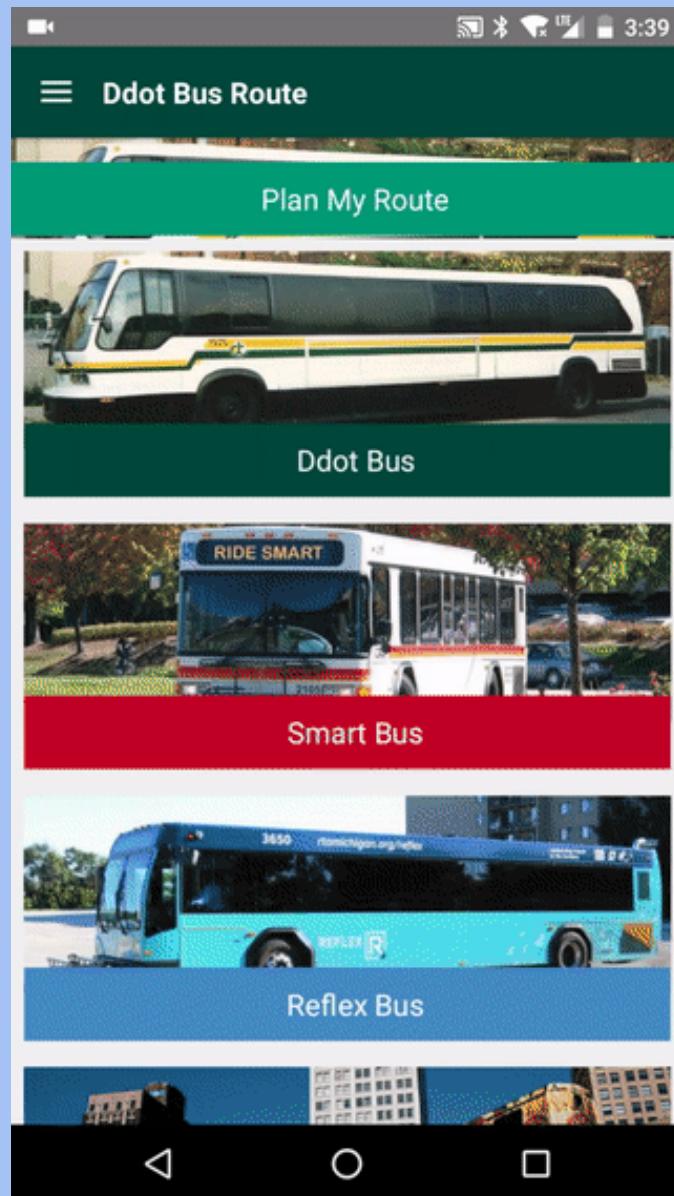
- app:preBuild
- app:preDebugBuild
- app:checkDebugManifest
- app:preReleaseBuild
- app:prepareComAndroidSupportAnimatedVectorDrawable2420Library
- app:prepareComAndroidSupportAppcompatV72420Library
- app:prepareComAndroidSupportSupportCompat2420Library
- app:prepareComAndroidSupportSupportCoreUi2420Library
- app:prepareComAndroidSupportSupportCoreUtils2420Library
- app:prepareComAndroidSupportSupportFragment2420Library
- app:prepareComAndroidSupportSupportMediaCompat2420Library

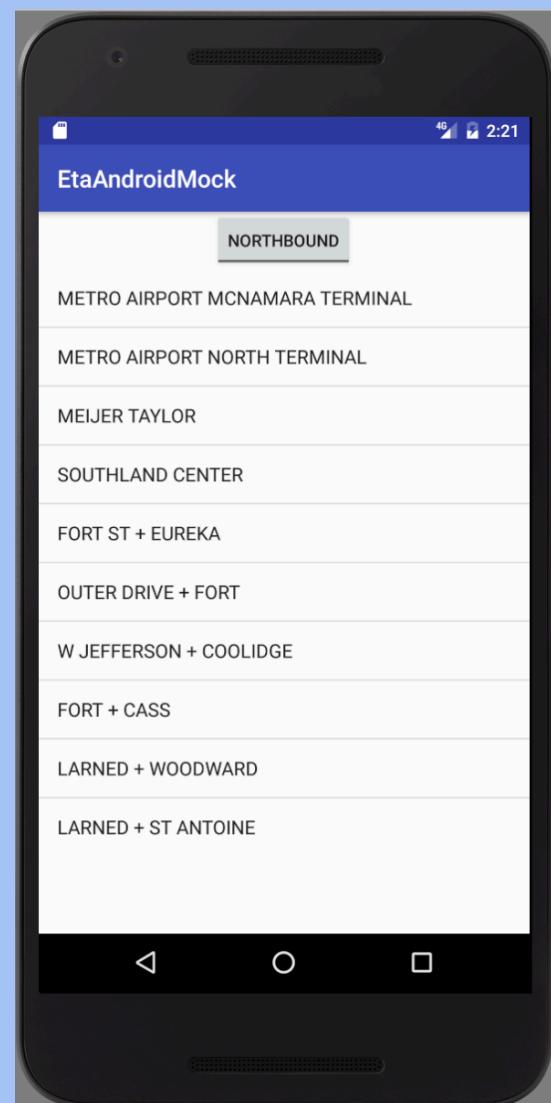
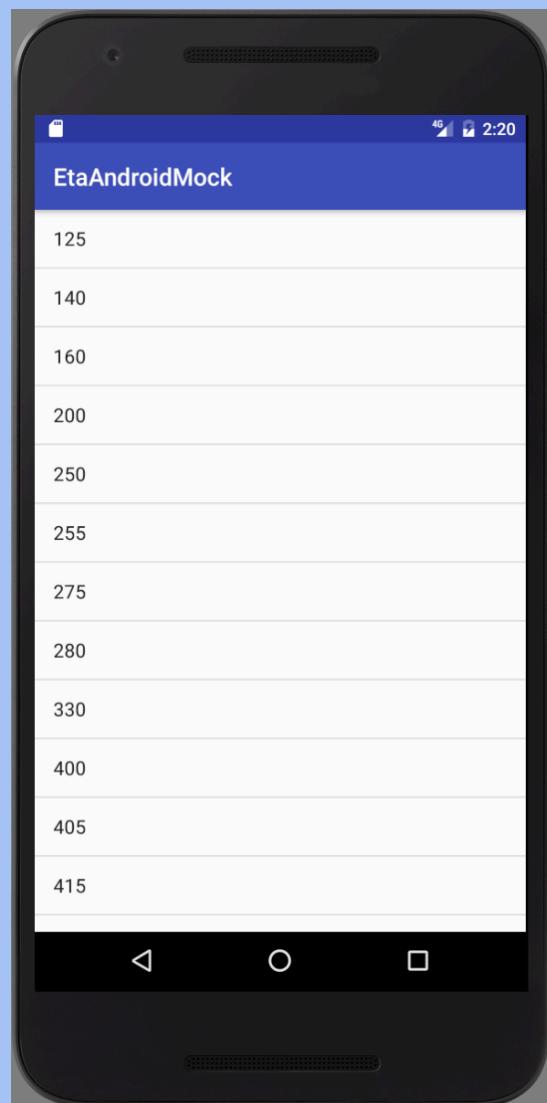
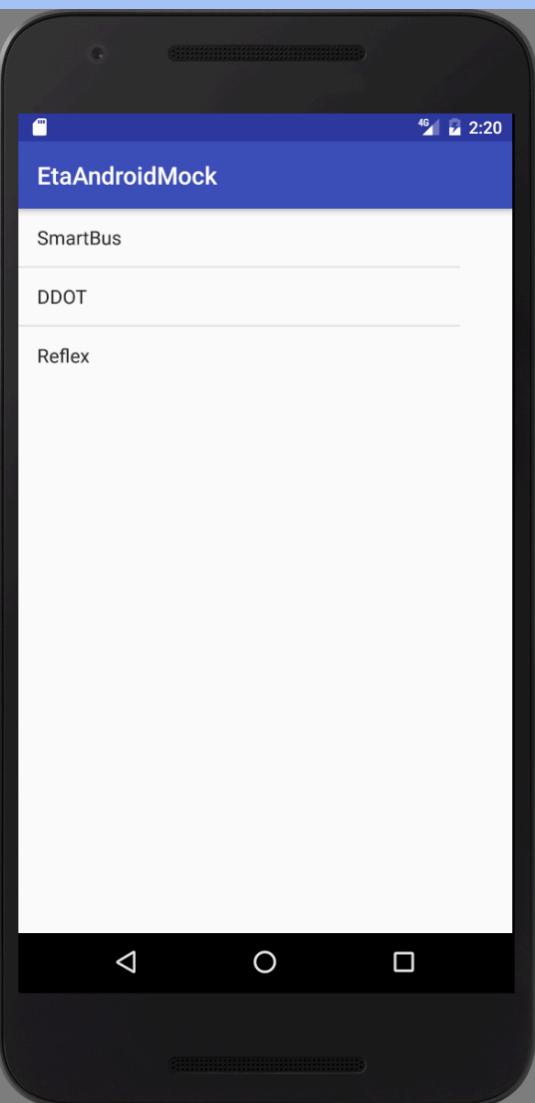
## Console Output

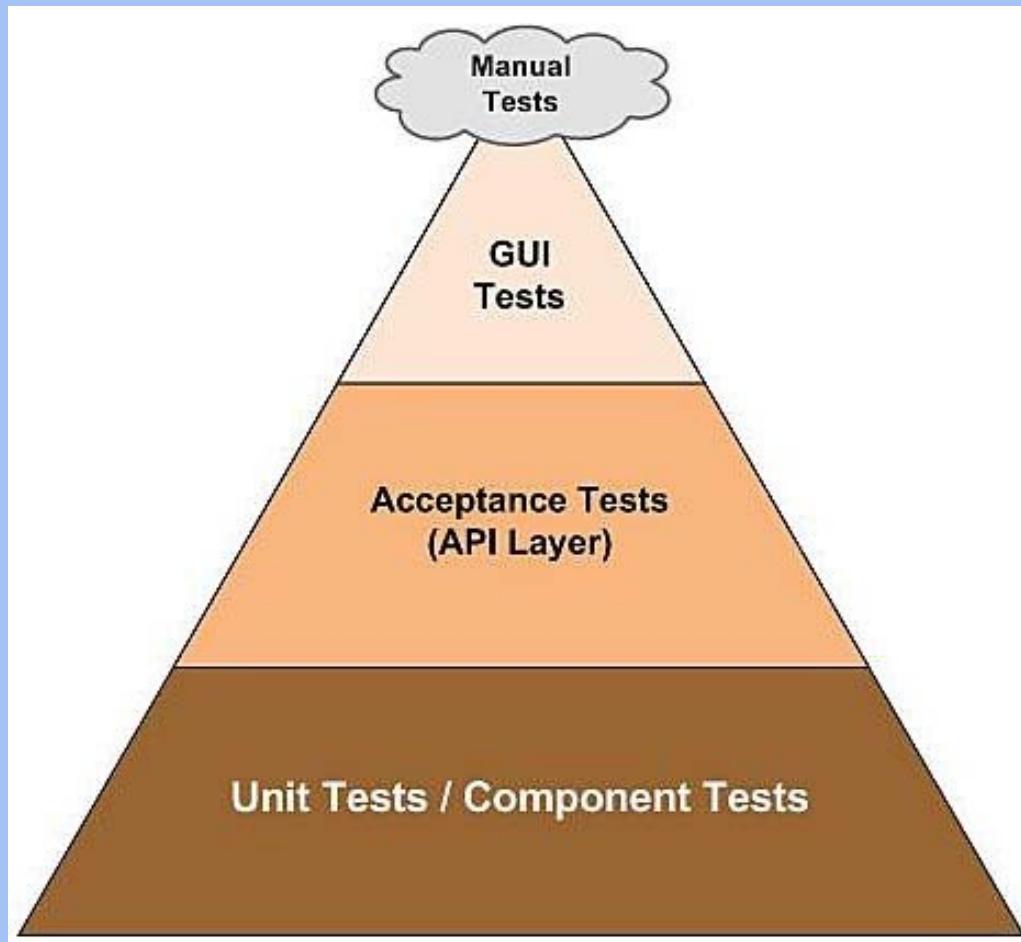
```
Started by user Godfrey Nolan
Building in workspace /Users/User/.jenkins/workspace/HelloWorld
> git rev-parse --is-inside-work-tree # timeout=10
Fetching changes from the remote Git repository
> git config remote.origin.url https://github.com/gnolanltu/HelloWorld/ # timeout=10
Fetching upstream changes from https://github.com/gnolanltu/HelloWorld/
> git --version # timeout=10
> git fetch --tags --progress https://github.com/gnolanltu/HelloWorld/ +refs/heads/*:refs/remotes/origin/*
> git rev-parse refs/remotes/origin/master^{commit} # timeout=10
> git rev-parse refs/remotes/origin/origin/master^{commit} # timeout=10
Checking out Revision 7b7412525c6cc2a9db4ce5e7d18438dfdb3a6e3a (refs/remotes/origin/master)
> git config core.sparsecheckout # timeout=10
> git checkout -f 7b7412525c6cc2a9db4ce5e7d18438dfdb3a6e3a
> git rev-list 7b7412525c6cc2a9db4ce5e7d18438dfdb3a6e3a # timeout=10
[Gradle] - Launching build.
[HelloWorld] $ /Users/User/.jenkins/workspace/HelloWorld/gradlew build
Incremental java compilation is an incubating feature.
:app:preBuild UP-TO-DATE
:app:preDebugBuild UP-TO-DATE
:app:checkDebugManifest
:app:preReleaseBuild UP-TO-DATE
:app:prepareComAndroidSupportAnimatedVectorDrawable2420Library
:app:prepareComAndroidSupportAppcompatV72420Library
:app:prepareComAndroidSupportSupportCompat2420Library
:app:prepareComAndroidSupportSupportCoreUi2420Library
:app:prepareComAndroidSupportSupportCoreUtils2420Library
:app:prepareComAndroidSupportSupportFragment2420Library
:app:prepareComAndroidSupportSupportMediaCompat2420Library
```

# TROUBLE SHOOTING

- run gradlew build from the command line
- Add sdk.dir to local.properties
- sdk.dir=/Users/Shared/Jenkins/Library/Android/sdk









Download  
API Blueprint

## Companies Collection

[List All Companies](#) >

### INTRODUCTION

### REFERENCE

[Companies Collection](#)

Routes Collection

Stops Collection

## Routes Collection

[Get a Companies Routes](#) >

## Stops Collection

[Get a Companies Stops](#) >



[Switch to Console](#)

Companies Collection / List All Companies

`GET http://ec2-204-236-211-33.compute-1.amazonaws.com:8080/companies`

### Request

Production

Raw

Try

### Response

200

#### HEADERS

Content-Type:application/json

#### BODY

```
 ETAAndroidMock — -bash — 80x24
:app:generateReleaseBuildConfig UP-TO-DATE
:app:generateReleaseResValues UP-TO-DATE
:app:generateReleaseResources UP-TO-DATE
:app:mergeReleaseResources UP-TO-DATE
:app:processReleaseManifest UP-TO-DATE
:app:processReleaseResources UP-TO-DATE
:app:generateReleaseSources UP-TO-DATE
:app:incrementalReleaseJavaCompilationSafeguard UP-TO-DATE
:app:compileReleaseJavaWithJavac UP-TO-DATE
:app:incrementalReleaseUnitTestJavaCompilationSafeguard UP-TO-DATE
:app:preReleaseUnitTestBuild UP-TO-DATE
:app:prepareReleaseUnitTestDependencies
:app:compileReleaseUnitTestJavaWithJavac UP-TO-DATE
:app:processReleaseJavaRes UP-TO-DATE
:app:processReleaseUnitTestJavaRes UP-TO-DATE
:app:compileReleaseUnitTestSources UP-TO-DATE
:app:assembleReleaseUnitTest UP-TO-DATE
:app:testReleaseUnitTest UP-TO-DATE
:app:test UP-TO-DATE

BUILD SUCCESSFUL

Total time: 1.124 secs
RIIS-MBPRO-13:ETAAndroidMock User$ ./gradlew test
```

Postman

Runner Import +

Builder Team Library IN SYNC Godfrey N... No Environment Filter

History Collections

All Me Team

ETAjson 1 request

GET http://ec2-204-236-211-33.compute-1.amazonaws.com:8080/companies/1/routes/1/Northbound/weekday/1/stops

Authorization Headers Body Pre-request Script Tests ●

Send Save Cookies Code

1 tests["Body has stopID"] = responseBody.has("stopID");  
2 tests["Body has stopName"] = responseBody.has("stopName");  
3 tests["Body has latitude"] = responseBody.has("latitude");  
4 tests["Body has longitude"] = responseBody.has("longitude");  
5  
6 var jsonData = JSON.parse(responseBody);  
7  
8 tests["The first stopID equals String 22362"] = jsonData[0].stopID === "22362";  
9 tests["The first stopName equals String METRO AIRPORT McNamara TERMINAL"] = jsonData[0]  
  .stopName === "METRO AIRPORT McNamara TERMINAL";  
10 tests["The first order equals String 1"] = jsonData[0].order === 1;

SNIPPETS

Clear a global variable  
Clear an environment variable  
Response body: Contains string  
Response body: Convert XML body to a JSON Object  
Response body: Is equal to a string  
Response body: JSON value check  
Response headers: Content-Type header check  
Response time is less than 200ms  
Set a global variable

Body Cookies Headers (5) Tests (7/7)

Status: 200 OK Time: 105 ms Size: 1.74 KB

All Passed Failed

PASS Body has latitude  
PASS Body has longitude  
PASS Body has stopID  
PASS Body has stopName

```
RIIS-MBPRO-13:Android User$ newman run ETAJson.postman_collection.json  
newman
```

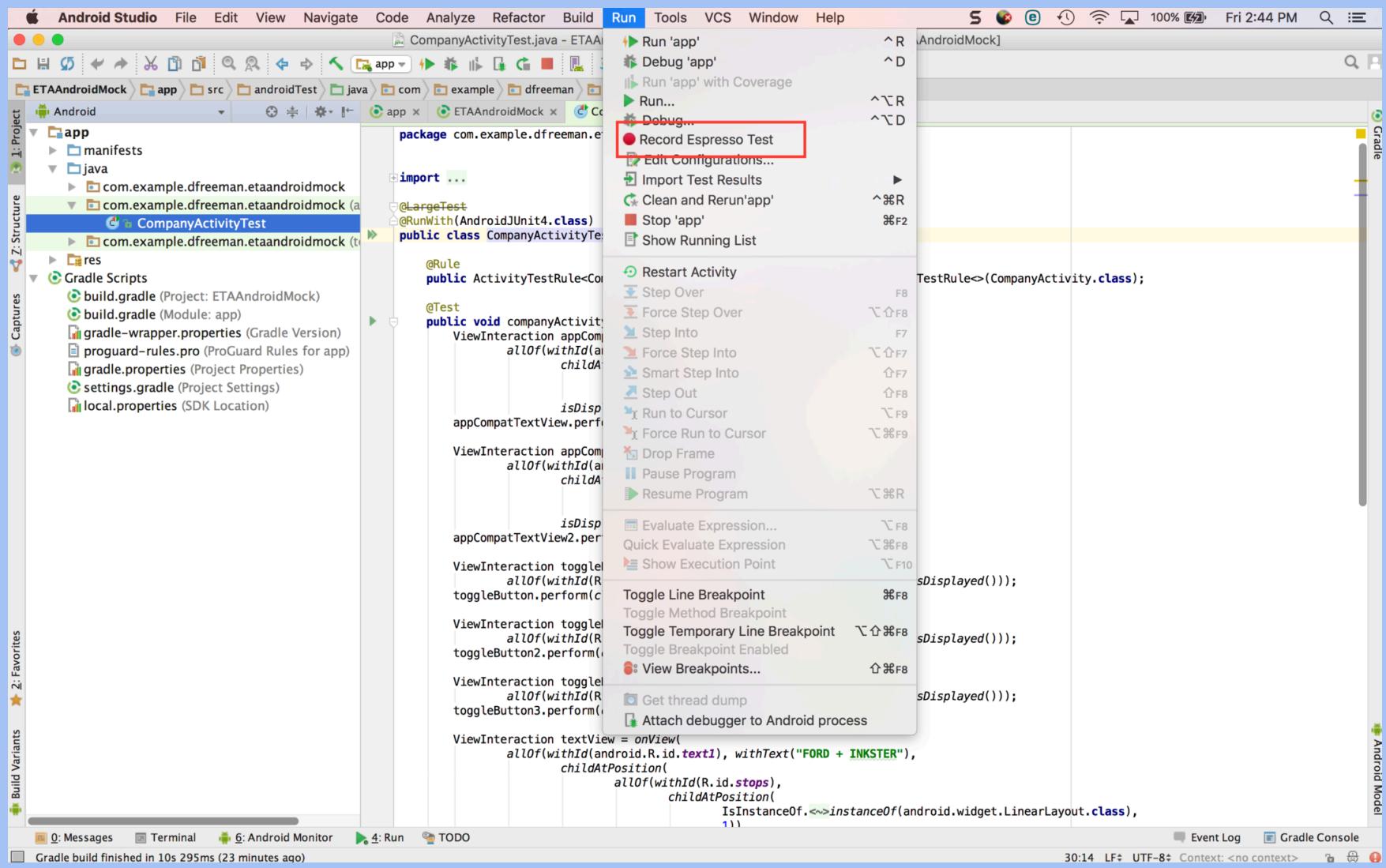
### ETAJson

```
→ http://ec2-204-236-211-33.compute-1.amazonaws.com:8080/companies/1/routes/1/Northbound/weekday/1/stops  
GET http://ec2-204-236-211-33.compute-1.amazonaws.com:8080/companies/1/routes/1/Northbound/weekday/1/stops [200 OK, 1.74KB,  
103ms]  
✓ Body has stopID  
✓ Body has stopName  
✓ Body has latitude  
✓ Body has longitude  
✓ The first stopID equals String 22362  
✓ The first stopName equals String METRO AIRPORT MCNAMARA TERMINAL  
✓ The first order equals String 1
```

	executed	failed
iterations	1	0
requests	1	0
test-scripts	1	0
prerequest-scripts	0	0
assertions	7	0
total run duration:	152ms	
total data received:	1.59KB (approx)	
average response time:	103ms	

# LAB 6 - INSTALL NEWMAN

1. Download nodejs from <https://nodejs.org/en/download/package-manager>
2. Install newman  
    `npm install newman --global;`
3. Run the tests  
    `newman run ETAJson.postman_collection.json`



```
 ETAAndroidMock — -bash — 80x24  
rides a deprecated API.  
Note: Recompile with -Xlint:deprecation for details.  
:app:compileDebugAndroidTestNdk UP-TO-DATE  
:app:compileDebugAndroidTestSources  
:app:mergeDebugAndroidTestShaders  
:app:compileDebugAndroidTestShaders  
:app:generateDebugAndroidTestAssets  
:app:mergeDebugAndroidTestAssets  
:app:transformClassesWithDexForDebugAndroidTest  
:app:mergeDebugAndroidTestJniLibFolders  
:app:transformNative_libsWithMergeJniLibsForDebugAndroidTest  
:app:processDebugAndroidTestJavaRes UP-TO-DATE  
:app:transformResourcesWithMergeJavaResForDebugAndroidTest  
:app:validateSigningDebugAndroidTest  
:app:packageDebugAndroidTest  
:app:assembleDebugAndroidTest  
:app:connectedDebugAndroidTest  
:app:connectedAndroidTest  
:app:connectedCheck  
  
BUILD SUCCESSFUL  
  
Total time: 30.159 secs  
RIIS-MBPR0-13:ETAAndroidMock User$ ./gradlew connectedCheck
```

# LAB 6 - ETA DETROIT JENKINS

Jenkins

search Godfrey Nolan | log out

Jenkins > HelloWorld > #6

Back to Project Status Changes Console Output View as plain text Edit Build Information Delete Build Git Build Data No Tags Previous Build

Executed Gradle Tasks

- app:preBuild
- app:preDebugBuild
- app:checkDebugManifest
- app:preReleaseBuild
- app:prepareComAndroidSupportAnimatedVectorDrawable2420Library
- app:prepareComAndroidSupportAppcompatV72420Library
- app:prepareComAndroidSupportSupportCompat2420Library
- app:prepareComAndroidSupportSupportCoreUi2420Library
- app:prepareComAndroidSupportSupportCoreUtils2420Library
- app:prepareComAndroidSupportSupportFragment2420Library
- app:prepareComAndroidSupportSupportMediaCompat2420Library

## Console Output

```
Started by user Godfrey Nolan
Building in workspace /Users/User/.jenkins/workspace/HelloWorld
> git rev-parse --is-inside-work-tree # timeout=10
Fetching changes from the remote Git repository
> git config remote.origin.url https://github.com/gnolanltu/HelloWorld/ # timeout=10
Fetching upstream changes from https://github.com/gnolanltu/HelloWorld/
> git --version # timeout=10
> git fetch --tags --progress https://github.com/gnolanltu/HelloWorld/ +refs/heads/*:refs/remotes/origin/*
> git rev-parse refs/remotes/origin/master^{commit} # timeout=10
> git rev-parse refs/remotes/origin/origin/master^{commit} # timeout=10
Checking out Revision 7b7412525c6cc2a9db4ce5e7d18438dfdb3a6e3a (refs/remotes/origin/master)
> git config core.sparsecheckout # timeout=10
> git checkout -f 7b7412525c6cc2a9db4ce5e7d18438dfdb3a6e3a
> git rev-list 7b7412525c6cc2a9db4ce5e7d18438dfdb3a6e3a # timeout=10
[Gradle] - Launching build.
[HelloWorld] $ /Users/User/.jenkins/workspace/HelloWorld/gradlew build
Incremental java compilation is an incubating feature.
:app:preBuild UP-TO-DATE
:app:preDebugBuild UP-TO-DATE
:app:checkDebugManifest
:app:preReleaseBuild UP-TO-DATE
:app:prepareComAndroidSupportAnimatedVectorDrawable2420Library
:app:prepareComAndroidSupportAppcompatV72420Library
:app:prepareComAndroidSupportSupportCompat2420Library
:app:prepareComAndroidSupportSupportCoreUi2420Library
:app:prepareComAndroidSupportSupportCoreUtils2420Library
:app:prepareComAndroidSupportSupportFragment2420Library
:app:prepareComAndroidSupportSupportMediaCompat2420Library
```

# LAB 6 - ETA DETROIT JENKINS

1. Run the unit tests  
gradlew test
2. Run the API tests  
newman run ETAJson\_collection.json
3. Run the UI tests  
gradlew connectedCheck
4. Build the app  
greadlew build

Main Dashboard

Unit Tests Coverage **14.5%** ↗

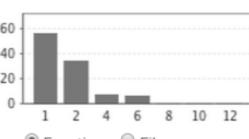
Line Coverage Condition Coverage  
11.7% ↗ 22.7% ↗

Lines Of Code **3,188** ↗ Files **59** ↗ Functions **116** ↗

Java Directories Lines Classes Statements Accessors  
**14** **5,801** ↗ **59** ↗ **982** ↗ **332**

Duplications **21.3%**  
Lines Blocks Files  
**1,235** **47** **21**

Complexity **205** ↗  
/Function /Class /File  
**1.8** **3.5** **3.5**



The chart displays the distribution of complexity across functions and files. The x-axis represents the number of functions/files (1 to 12), and the y-axis represents complexity (0 to 60). The legend indicates that dark bars represent Functions and light bars represent Files. The distribution is highly skewed, with the highest complexity found in the first few functions/files.

Category	Value	Description
Functions	1	~55
Functions	2	~35
Files	4	~5
Files	6	~5

Time changes... ▾

SQALE Rating **A**

Technical Debt Ratio **6.4%**

Debt **12d** ↗ Issues **300** ↘

Severity	Count
Blocker	0
Critical	20 ↗
Major	134 ↗
Minor	136 ↘
Info	10 ↗

Directory Tangle Index **0.0%**

Dependencies To Cut  
Between Directories **0** Between Files **0**

Unit Tests Coverage **14.5%** ↗

Line Coverage Condition Coverage  
11.7% ↗ 22.7% ↗

sonarqube Dashboards ▾ Issues Measures Rules Quality Profiles Quality Gates More ▾

Log in

CropCompare

Version 2.0 / November 4 2015 11:16 AM

Overview Components Issues More ▾

Severity

	Blocker	Minor	Critical	Info	Major
0	97	14	1		87

Resolution

	Unresolved	Fixed	False Positive	Won't fix	Removed
199	0	0	0	0	0

Status

New Issues

Rule

Tag

Module

Directory

File

Assignee

Reporter

Author

Language

Issues List:

1 / 199 Reload New Search

CropCompare src/main/java/com/riis/cropcompare/AnimatorAdapter.java

Add a nested comment explaining why this method is empty, throw an UnsupportedOperationException or complete the implementation. 13 minutes ago L7

Major Open Not assigned Not planned 5min debt

CropCompare src/main/java/com/riis/cropcompare/Crop.java

1 duplicated blocks of code must be removed. 13 minutes ago

Major Open Not assigned Not planned 20min debt

CropCompare src/main/java/com/riis/cropcompare/CropCard.java

1 duplicated blocks of code must be removed. 13 minutes ago

Major Open Not assigned Not planned 20min debt

# LAB 7 - SONARQUBE

1. Download SonarQube and unzip the SonarQube distribution into /etc/sonarqube
2. Download SonarQube scanner and install in /etc/sonar-scanner
3. Login to SonarQube on <http://localhost:9090> with the default System administrator credentials which are admin/admin
4. Go to Setting->Update Center->Available Plugins->Languages->Android, install the plugin
5. Once the plugin is installed go to click on Installed Plugins in the Update Center.
6. Download the SonarQube examples and unzip in /etc/sonar-examples
7. In one terminal on the CI server start the console  
    sudo /etc/sonarqube/bin/macosx-universal-64/sonar.sh console
8. In another terminal cd /etc/sonar-scanning-examples/sonarqube-scanner and run the sonar-scanner as follows /etc/sonar-scanner/bin/sonar-scanner
9. Add sonar project properties to your root dir,  
e.g. <https://github.com/gnolanltu/EtaAndroid/blob/master/sonar-project.properties>
10. Add SonarQube and SonarScanner to Jenkins

```
/etc/sonarqube/conf/sonar.properties
# HTTP proxy (default none)
http.proxyHost=proxyvipfmcc.nb.ford.com
http.proxyPort=83
# HTTPS proxy (defaults are values of http.proxyHost and http.proxyPort)
https.proxyHost=proxyvipfmcc.nb.ford.com
https.proxyPort=83
```

# LAB 7 - SONARQUBE

SonarQube servers

Environment variables

Enable injection of SonarQube server configuration as build environment variables  
If checked, job administrators will be able to inject a SonarQube server configuration as environment variables in the build.

SonarQube installations

Name	SwiftSonar
Server URL	http://localhost:9000
Server version	Default is http://localhost:9000 5.3 or higher ▾
Server authentication token	Configuration fields depend on the SonarQube server version. 
SonarQube account login	SonarQube authentication token. Mandatory when anonymous access is disabled.
SonarQube account password	SonarQube account used to perform analysis. Mandatory when anonymous access is disabled. No longer used since SonarQube 5.3.
	SonarQube account used to perform analysis. Mandatory when anonymous access is disabled. No longer used since SonarQube 5.3.

Advanced...

# LAB 7 - SONARQUBE

SonarQube Scanner

SonarQube Scanner installations

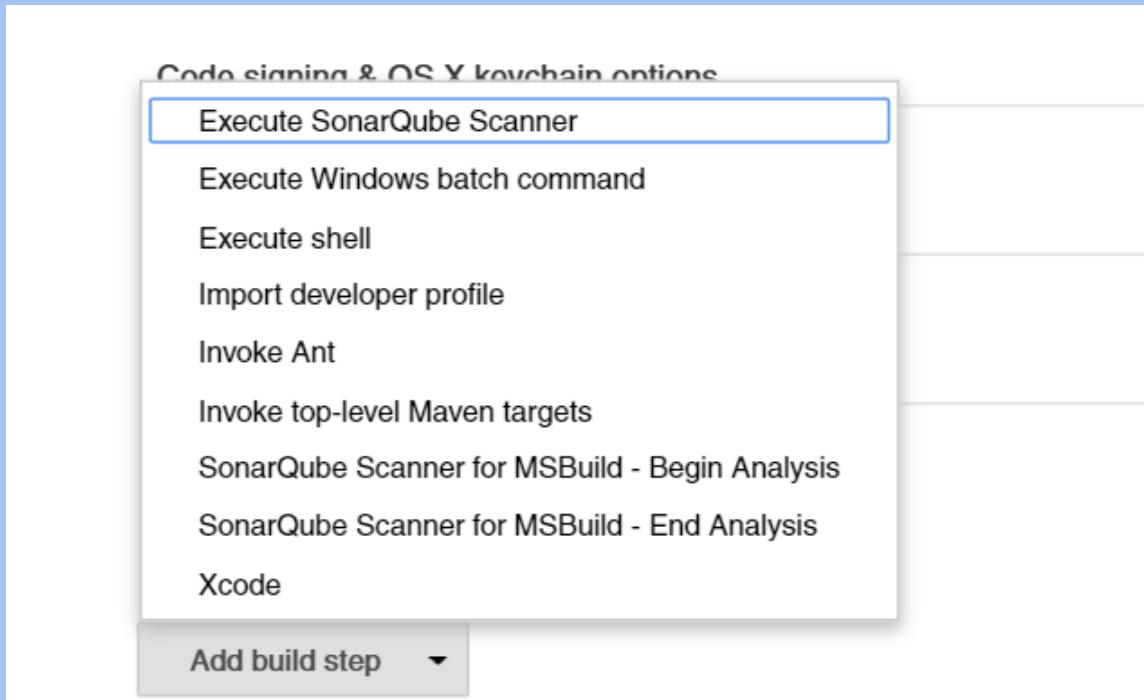
<input type="checkbox"/> SonarQube Scanner	Name SwiftSonar
<input type="checkbox"/> SONAR_RUNNER_HOME	/etc/sonar-runner
<input type="checkbox"/> Install automatically	

[Delete SonarQube Scanner](#)

Add SonarQube Scanner

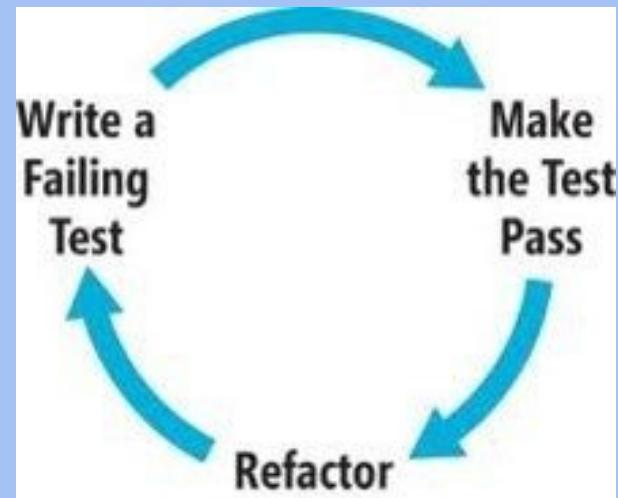
List of SonarQube Scanner installations on this system

# LAB 7 - SONARQUBE



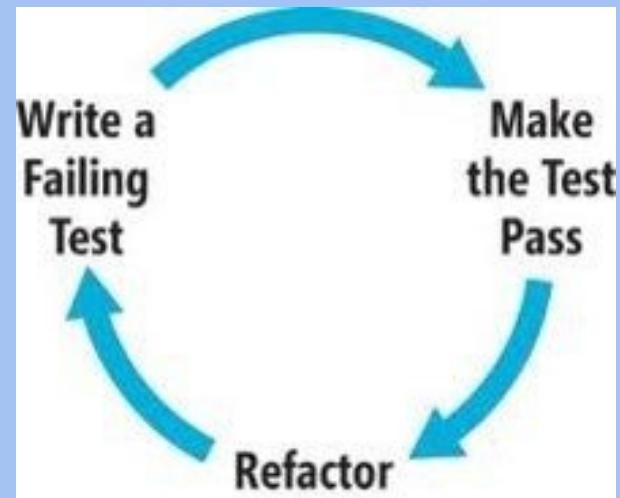
# TEST DRIVEN DEVELOPMENT (TDD)

- Unit testing vs TDD
- Why TDD
- Sample app
- Lessons learned



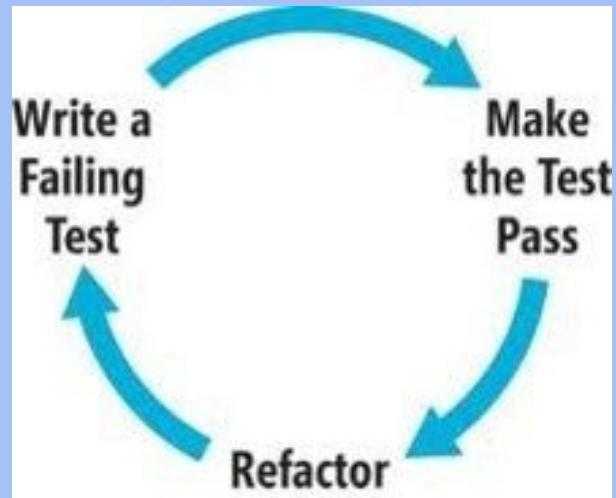
# TEST DRIVEN DEVELOPMENT

- Write test first
- See it fail
- Write simplest possible solution to get test to pass
- Refactor
- Wash, Rinse, Repeat



# TEST DRIVEN DEVELOPMENT

- Built in regression testing
- Longer life for your codebase
- YAGNI feature development
- Red/Green/Refactor helps kill procrastination



# TDD

You can't TDD w/o unit testing

TDD means writing the tests  
before the code

TDD is more painless than  
classic unit testing

# UNIT TESTING

You can unit test w/o TDD

Unit tests don't mandate when  
you write the tests

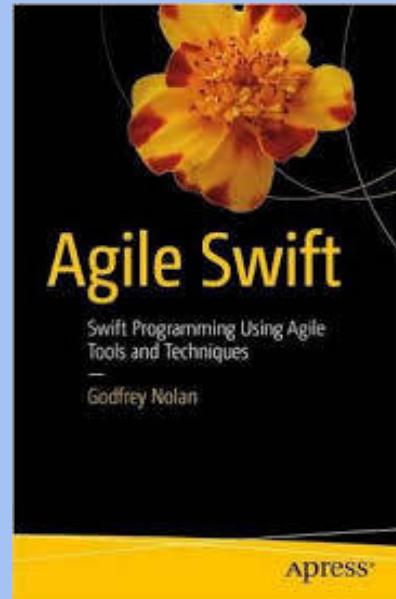
Unit tests are often written at  
the end of a coding cycle

# STEPS

- Introduce Continuous Integration to build code
- Configure android projects for TDD
- Add minimal unit tests based on existing tests, add to CI
- Show team how to create unit tests
- Add testing code coverage metrics to CI, expect 5-10%
- Add Espresso tests
- Unit test new features or sprouts, mock existing objects
- Wrap or ring fence existing code, remove unused code
- Refactor wrapped code to get code coverage to 60-70%  
(New refactoring in Android Studio)

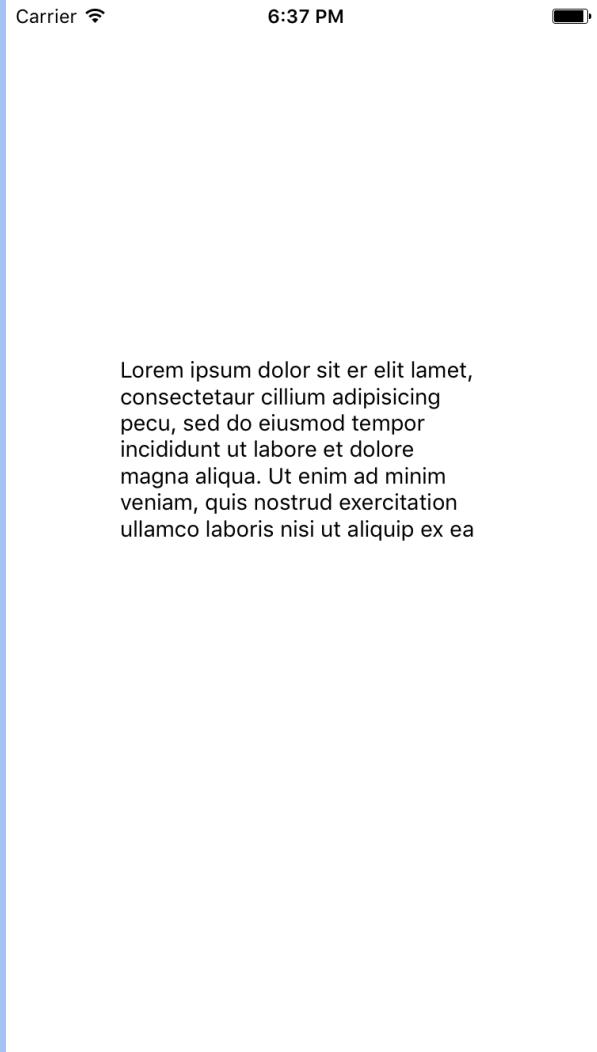
# CONTACT INFO

godfrey@riis.com



# IOS AGENDA

- Why??
- Unit, UI and API testing 101
- Calculator Example
- No really why?? (FIRST)
- ETA Detroit
- XCTest
- XCUI
- Postman / Newman
- Jenkins

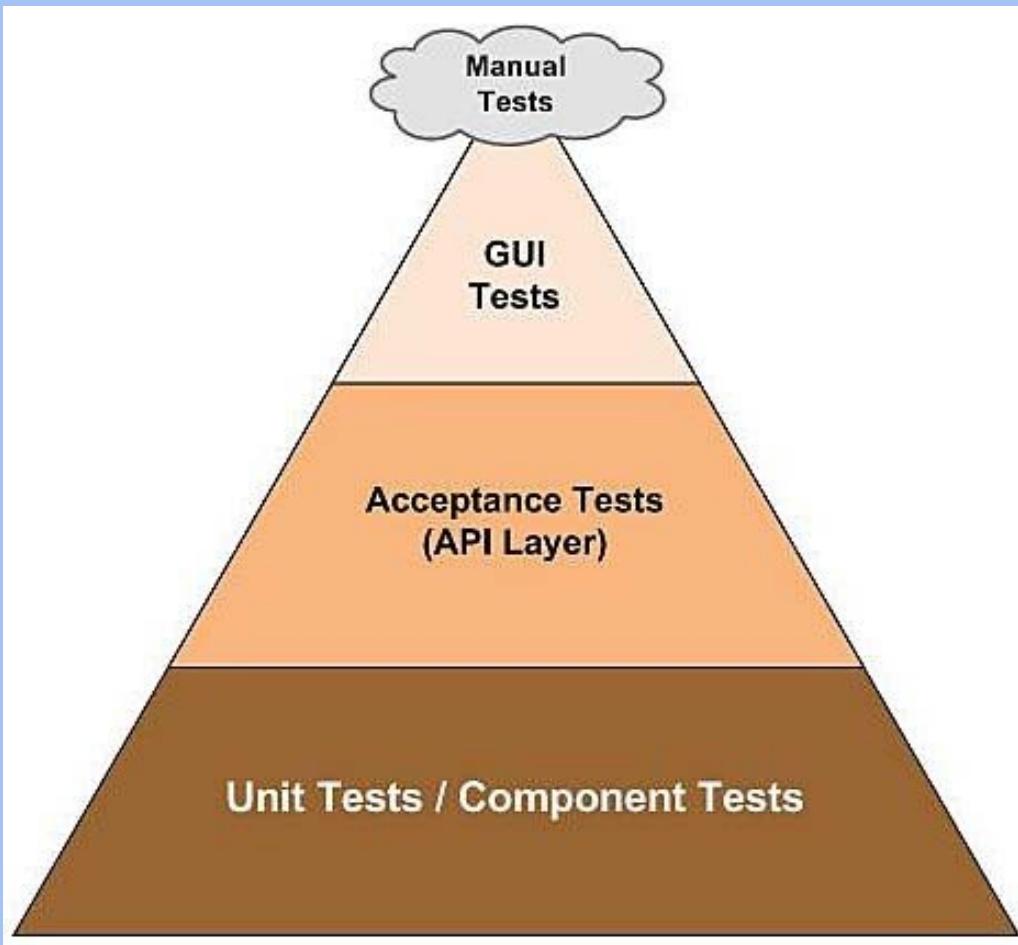


```
[RIIS-MBPR0-13:HelloWorld2 User$ swift package init
Creating library package: HelloWorld2
Creating Package.swift
Creating .gitignore
Creating Sources/
Creating Sources/HelloWorld2.swift
Creating Tests/
Creating Tests/LinuxMain.swift
Creating Tests>HelloWorld2Tests/
Creating Tests>HelloWorld2Tests>HelloWorld2Tests.swift
RIIS-MBPR0-13:HelloWorld2 User$ ]
```

```
RIIS-MBPRO-13:HelloWorld2 User$ swift test
Compile Swift Module 'HelloWorld2' (1 sources)
Compile Swift Module 'HelloWorld2Tests' (1 sources)
Linking ./build/debug/HelloWorld2PackageTests.xctest/Contents/MacOS/HelloWorld2PackageTests
Test Suite 'All tests' started at 2017-04-07 18:45:50.743
Test Suite 'HelloWorld2PackageTests.xctest' started at 2017-04-07 18:45:50.744
Test Suite 'HelloWorld2Tests' started at 2017-04-07 18:45:50.744
Test Case '-[HelloWorld2Tests.HelloWorld2Tests testExample]' started.
Test Case '-[HelloWorld2Tests.HelloWorld2Tests testExample]' passed (0.002 seconds).
Test Suite 'HelloWorld2Tests' passed at 2017-04-07 18:45:50.747.
    Executed 1 test, with 0 failures (0 unexpected) in 0.002 (0.002) seconds
Test Suite 'HelloWorld2PackageTests.xctest' passed at 2017-04-07 18:45:50.747.
    Executed 1 test, with 0 failures (0 unexpected) in 0.002 (0.003) seconds
Test Suite 'All tests' passed at 2017-04-07 18:45:50.747.
    Executed 1 test, with 0 failures (0 unexpected) in 0.002 (0.004) seconds
```

# WHY

- Catch more mistakes
- Confidently make more changes
- Built in regression testing
- Extend the life of your codebase
- Better predictability and reliability



# **FOLLOW ALONG**

`git clone http://github.com/godfreynolan/CodeCraftsman`

iPhone 6s – iOS 10.0 (14A5309d)

Carrier

4:27 PM



0

7

8

9

/

4

5

6

\*

1

2

3

-

0

=

Clear

+

Choose options for your new project:

Product Name:

Organization Name:

Organization Identifier:

Bundle Identifier: com.riis.Calculator

Language:

Devices:

Use Core Data

Include Unit Tests

Include UI Tests

[Cancel](#)

[Previous](#)

[Next](#)

The screenshot shows the Xcode interface with the following details:

- Project Navigator:** Shows the project structure for "Calculator". The "CalculatorModel.swift" file is selected and highlighted in blue.
- Editor:** Displays the content of the "CalculatorModel.swift" file. The code defines a class "CalculatorModel" with four methods: add, sub, mul, and div. The "div" method includes a guard statement to prevent division by zero.
- Toolbar:** Standard Xcode toolbar with icons for file operations, search, and build.
- Status Bar:** Shows "Calculator | Build Calculator: Succeeded | 12/4/16 at 12:55 PM".

```
1 ///
2 //  CalculatorModel.swift
3 //  Calculator
4 //
5 //  Created by User on 12/4/16.
6 //  Copyright © 2016 example. All rights reserved.
7 //

8
9 import Foundation
10
11
12 class CalculatorModel {
13     var a: Int!
14     var b: Int!
15
16     func add(_ a:Int, _ b:Int) -> Int {
17         return a + b
18     }
19
20     func sub(_ a:Int, _ b:Int) -> Int {
21         return a - b
22     }
23
24     func mul(_ a:Int, _ b:Int) -> Int {
25         return a * b
26     }
27
28     func div(_ a:Int, _ b:Int) -> Int {
29         guard b != 0 else {
30             return 0
31         }
32         return a / b
33     }
34 }
35 }
```

The screenshot shows the Xcode interface with the following details:

- Top Bar:** Shows the project name "Calculator", target "iPhone 6s Plus", and status "Calculator | Build Calculator: Succeeded | 4/10/16 at 12:09 PM".
- Left Navigator:** Lists the project structure:
  - Calculator**: Contains `AppDelegate.swift`, `ViewController.swift`, `Main.storyboard`, `Assets.xcassets`, `LaunchScreen.storyboard`, `Info.plist`, and `CalculatorModel.swift`.
  - CalculatorTests**: Contains `CalculatorTests.swift`, `Info.plist`, `CalculatorUITests`, and `Products`. The `CalculatorTests.swift` file is selected and highlighted with a blue background.
- Right Editor:** Displays the content of the `CalculatorTests.swift` file. A red arrow points from the left sidebar towards the code editor area, specifically highlighting the selected file in the Navigator.

```
//  
// CalculatorTests.swift  
// CalculatorTests  
//  
// Created by Admin on 4/7/16.  
// Copyright © 2016 riis. All rights reserved.  
  
import XCTest  
@testable import Calculator  
  
class CalculatorTests: XCTestCase {  
  
    let resCalc = Calculator(a:10,b:10)  
  
    override func setUp() {  
        super.setUp()  
    }  
  
    override func tearDown() {  
        super.tearDown()  
    }  
  
    func testAdd() {  
        XCTAssertEqual(resCalc.add(1,b: 1),2)  
        XCTAssertEqual(resCalc.add(1,b: 2),3)  
        XCTAssertEqual(resCalc.add(5,b: 4),9)  
    }  
}
```

```
CalculatorTests.swift
Calculator < > CalculatorTests < > CalculatorTests.swift < > No Selection
1 ///
2 //  CalculatorTests.swift
3 //  CalculatorTests
4 //-
5 //  Created by User on 12/4/16.
6 //  Copyright © 2016 example. All rights reserved.
7 //-
8
9 import XCTest
10 @testable import Calculator
11
12 class CalculatorTests: XCTestCase {
13
14     var resCalc : CalculatorModel!
15
16     override func setUp() {
17         super.setUp()
18         resCalc = CalculatorModel()
19     }
20
21     func testAdd() {
22         XCTAssertEqual(resCalc.add(1, 1), 2)
23         XCTAssertEqual(resCalc.add(1, 2), 3)
24         XCTAssertEqual(resCalc.add(5, 4), 9)
25     }
26
27 }
28
```

Calculator iPhone 6s Plus

Calculator | Build Calculator: Succeeded | Today at 5:44 PM

Test Calculator : 5:44:53 PM

By Group By Time

Test Calculator Today, 5:44 PM

Build Calculator Today, 5:44 PM

Test Calculator Today, 5:25 PM

Build Calculator Today, 5:25 PM

Debug Calculator 4/20/16, 4:13 PM

All Recent All Messages All Issues Errors Only Logs Filter

Test target CalculatorTests

Scheme Calculator | Destination iPhone 6s Plus

Writing diagnostic log for test session

/Users/admin/Library/Developer/Xcode/DerivedData/Calculator-bwfjzxnyxgyoajhcolzaojlhjtly/Logs/Test/870A64B4-12C5-4DA2-B3B1-C866BB... more

Run test suite Selected tests 2 out of 2 tests passed, 0.009 seconds

Run test suite CalculatorTests 2 out of 2 tests passed, 0.009 seconds

Test Suite 'Selected tests' started at 2016-04-27 17:44:52.564

Test Suite 'CalculatorTests' started at 2016-04-27 17:44:52.565

Test Case '-[CalculatorTests.CalculatorTests testAdd]' started.

Test Case '-[CalculatorTests.CalculatorTests testAdd]' passed (0.008 seconds).

Test Case '-[CalculatorTests.CalculatorTests testDivideByZero]' started.

Test Case '-[CalculatorTests.CalculatorTests testDivideByZero]' passed (0.001 seconds).

Run test case testAdd() 0.008 seconds

Run test case testDivideByZero() 0.001 seconds

Test Case '-[CalculatorTests.CalculatorTests testAdd]' passed (0.008 seconds).

Test Case '-[CalculatorTests.CalculatorTests testDivideByZero]' started.

Testing Complete 4/27/16, 5:44 PM

No issues

Calculator | Build Calculator: Succeeded | Today at 8:25 PM 1

CalculatorTests 2 tests, 1 failing

CalculatorTests

testAdd() ✘ testDivideByZero() ✓

```
//  
// CalculatorTests.swift  
// CalculatorTests  
// Created by Admin on 4/20/16.  
// Copyright © 2016 riis. All rights reserved.  
  
import XCTest  
@testable import Calculator  
  
class CalculatorTests: XCTestCase {  
    let resCalc = CalculatorModel(a:0,b:0)  
  
    func testAdd() {  
        XCTAssertEqual(resCalc.add(1, b: 1), 2)  
        XCTAssertEqual(resCalc.add(1, b: 2), 4)  
        XCTAssertEqual(resCalc.add(5, b: 4), 9)  
    }  
  
    func testDivideByZero() {  
        XCTAssertEqual(resCalc.div(0, b: 0), 0)  
    }  
}
```

XCTAssertEqual failed: ("Optional(3)") is not equal to ("Optional(4)")



Calculator > iPhone 6s Plus Testing... 1

CalculatorTests PID 21223

- CPU
- Memory
- Disk Zero KB/s
- Network Zero KB/s

Thread 1 Queue: com....-thread (serial)

- 0 CalculatorTests.testAdd() -> ()
- 1 @objc CalculatorTests.testAdd()
- 20 UIApplicationMain
- 21 main
- 22 start
- 23 start

Thread 2 Queue: com....anager (serial)

Thread 3

Thread 4

Thread 5 Queue: parsi...queue (serial)

Thread 7

Thread 8

CalculatorTests.swift

```
// CalculatorTests.swift
// CalculatorTests
//
// Created by Admin on 4/20/16.
// Copyright © 2016 riis. All rights reserved.

import XCTest
@testable import Calculator

class CalculatorTests: XCTestCase {

    let resCalc = CalculatorModel(a:0,b:0)

    func testAdd() {
        XCTAssertEqual(resCalc.add(1, b: 1),2)
        XCTAssertEqual(resCalc.add(1, b: 2),4)
        XCTAssertEqual(resCalc.add(5, b: 4),9)
    }

    func testDivideByZero() {
        XCTAssertEqual(resCalc.div(0, b: 0),0)
    }
}
```

Thread 1: breakpoint 1.1

self = (CalculatorTests.CalculatorTests) 0x00007fc5f8470fa0

XCTest.XCTTestCase (XCTestCase)

XCTest

\_internalImplementation = (\_XCTestCaseImplementation \*) 0x7fc5f846ff00

resCalc = (Calculator.CalculatorModel) 0x00007fc5f8470350

a = (int) 0

b = (int) 0

\_XCT\_testBundleReadyWithProtocolVersion:minimumVersion:  
reply received  
20:27:04.714 Calculator[21223:553380]  
\_IDE\_startExecutingTestPlanWithProtocolVersion:16  
Test Suite 'Selected tests' started at 2016-04-27  
20:27:04.723  
Test Suite 'CalculatorTests' started at 2016-04-27  
20:27:04.724  
Test Case '-[CalculatorTests.CalculatorTests testAdd]'  
started.  
(lldb)

All Output

Calculator > iPhone 6s Plus

Calculator | Build Calculator: Succeeded | Today at 5:25 PM

Test Calculator : 5:26:14 PM

By Group By Time

Recent All Messages All Issues Errors Only Filter

Test target CalculatorTests

Scheme Calculator | Destination iPhone 6s Plus

Run test suite Selected tests

Run test suite CalculatorTests

Run test case testDivideByZero()

testDivideByZero() encountered an error (Lost connection to test manager service. If you believe this error represents a bug, please att... more)

Testing Complete 4/27/16, 5:26 PM

1 error

17:25:29.526  
Test Suite 'CalculatorTests' started at 2016-04-27  
17:25:29.527  
Test Case '[-[CalculatorTests.CalculatorTests  
testDivideByZero]]' started.

Auto Filter All Output

BasicCalculator | Build BasicCalculator: Succeeded | Today at 8:31 PM

BasicCalculatorTests.swift | testPerformanceExample()

```
override func setUp() {
    super.setUp()
    // Put setup code here. This method is called before the invocation of each test method in the class.
}

override func tearDown() {
    // Put teardown code here. This method is called after the invocation of each test method in the class.
    super.tearDown()
}

func testAdd() {
    XCTAssertEqual(resCalc.add(1, 1), 2)
    XCTAssertEqual(resCalc.add(1, 2), 3)
    XCTAssertEqual(resCalc.add(5, 4), 9)
}

func testExample() {
    // This is an example of a functional test case.
    XCTAssertTrue(true, "Pass")
}

func testPerformanceExample() {
    self.measureBlock() {
        XCTAssertEqual(self.resCalc.add(1, 2), 3)
    }
}
```

Performance Result

Metric: Time  
Result: No Baseline  
Average: 0.000s  
Baseline: No Baseline  
Max STDEV: 10.000%

Set Baseline

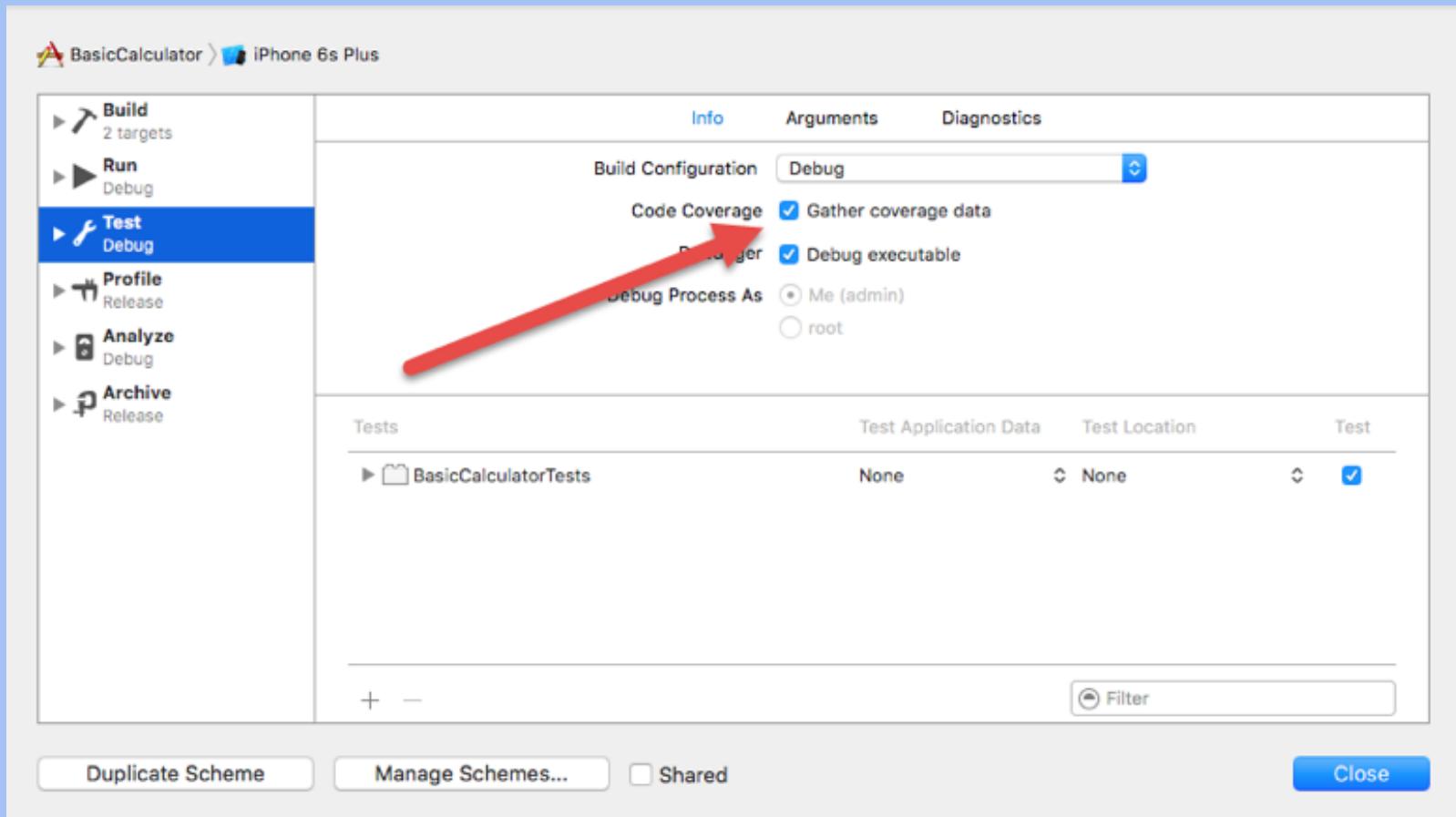
0.000 sec (296% STDEV)

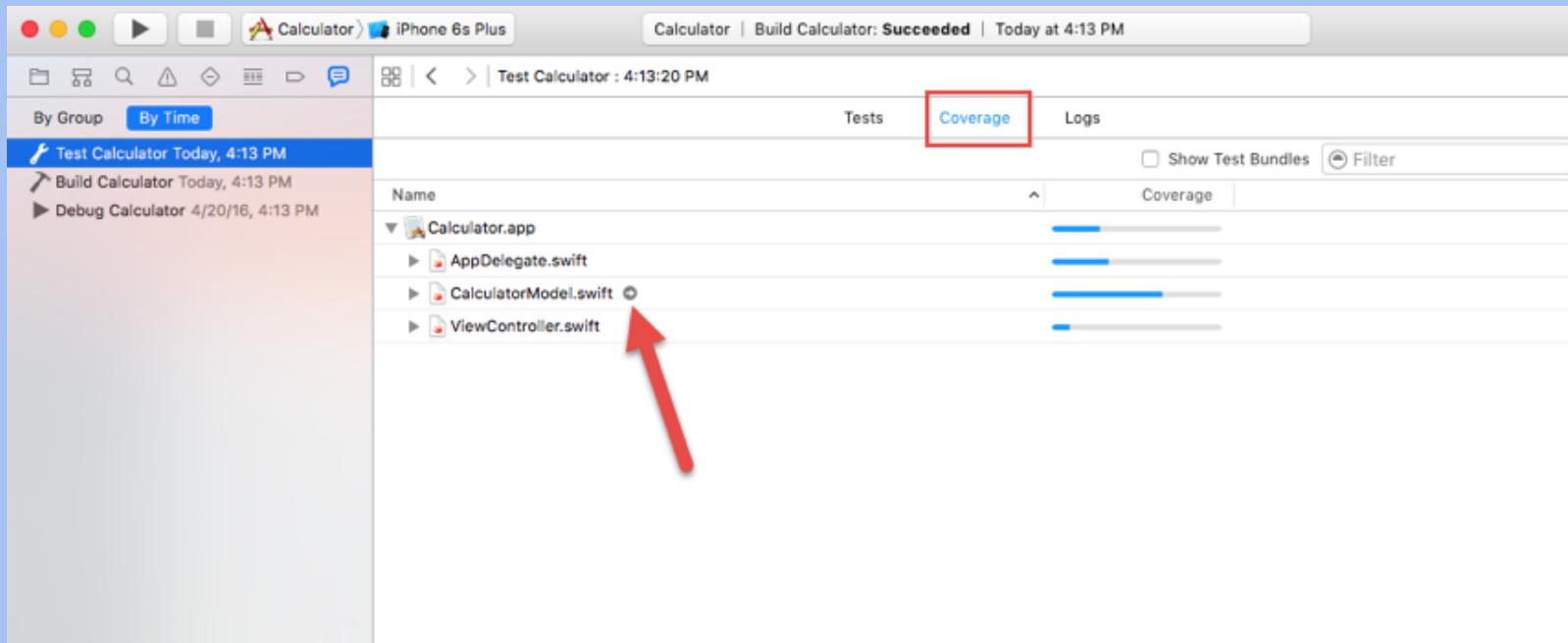
Test session log:  
/Users/admin/L  
cauomezodnchenewy  
Session-2016-04-18

Value: 0.00 (329.35%)  
20:31:12.085.

Test Suite 'Basic' Executed 1 test, with 0 failures (0 unexpected) in 0.283 (0.285) seconds

Test Suite 'Selected tests' passed at 2016-04-18 20:31:12.086.  
Executed 1 test, with 0 failures (0 unexpected) in 0.283 (0.288) seconds





Calculator iPhone 6s Plus

Calculator | Build Calculator: Succeeded | Today at 4:13 PM

By Group By Time

Test Calculator Today, 4:13 PM

Build Calculator Today, 4:13 PM

Debug Calculator 4/20/16, 4:13 PM

```
// CalculatorModel.swift
// Calculator
//
// Created by Admin on 4/16/16.
// Copyright © 2016 riis. All rights reserved.
//

import Foundation

class CalculatorModel {

    var a: Int
    var b: Int

    init(a:Int, b:Int){
        self.a = a
        self.b = b
    }

    func add(a:Int, b:Int) -> Int {
        return a + b
    }

    func sub(a:Int, b:Int) -> Int {
        return a - b
    }

    func mul(a:Int, b:Int) -> Int {
        return a * b
    }

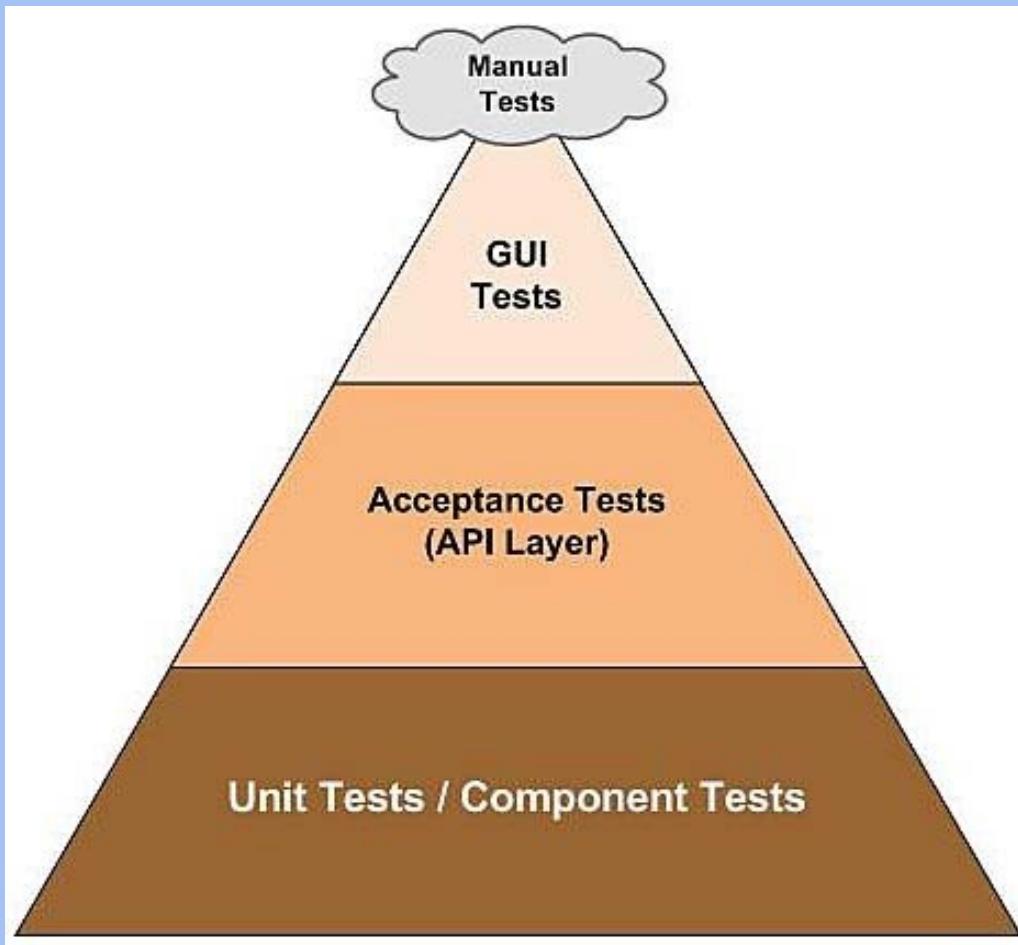
    func div(a:Int, b:Int) -> Int {
        guard b != 0 else {
            return 0
        }
        return a / b
    }
}
```

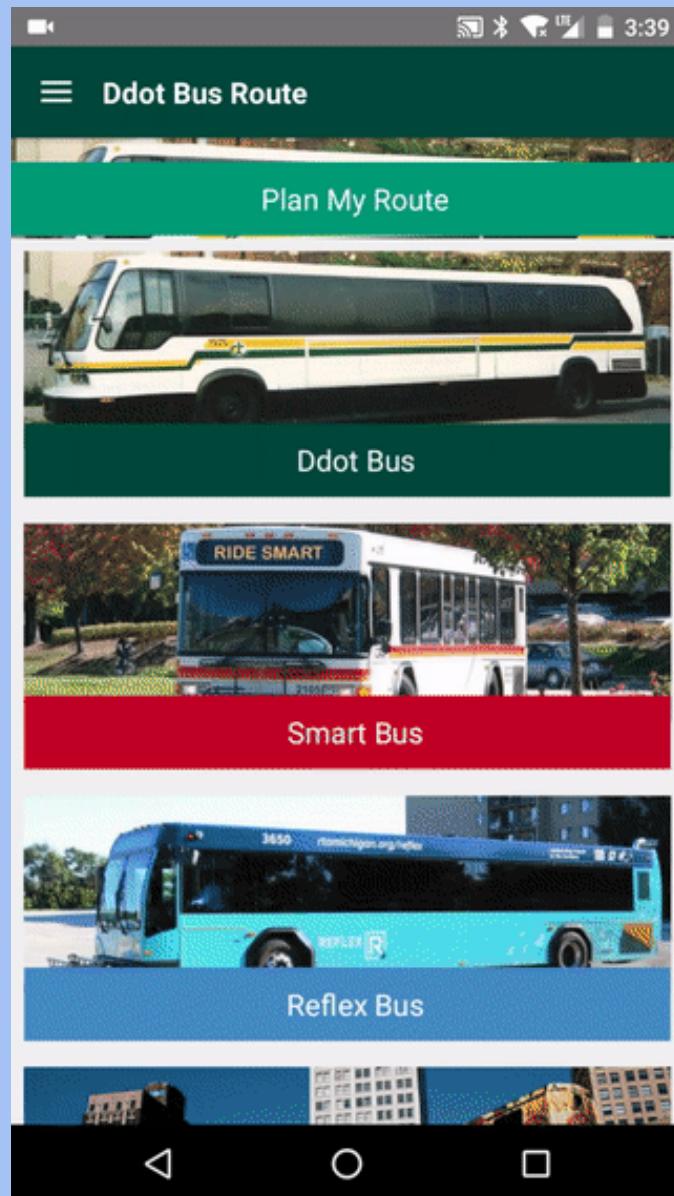
# MORE TOOLS - BUT WHY??

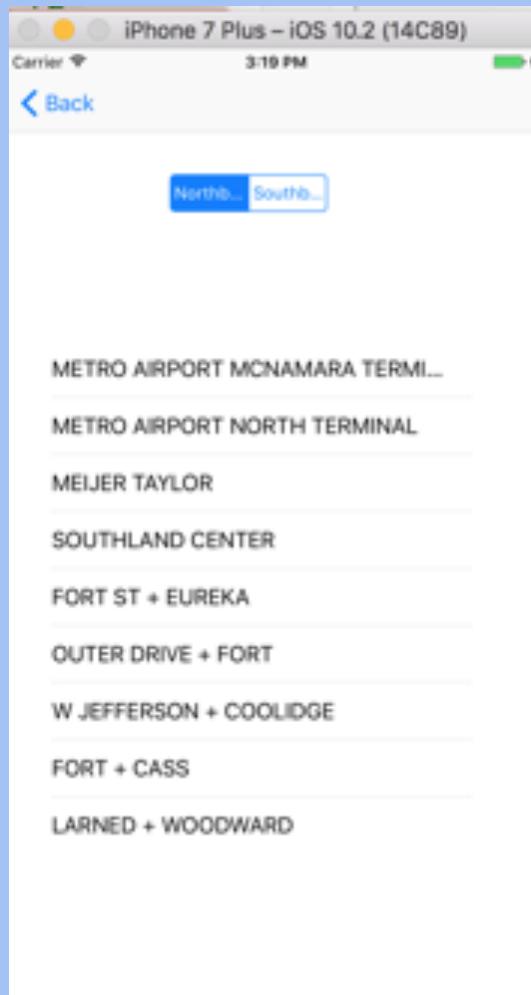
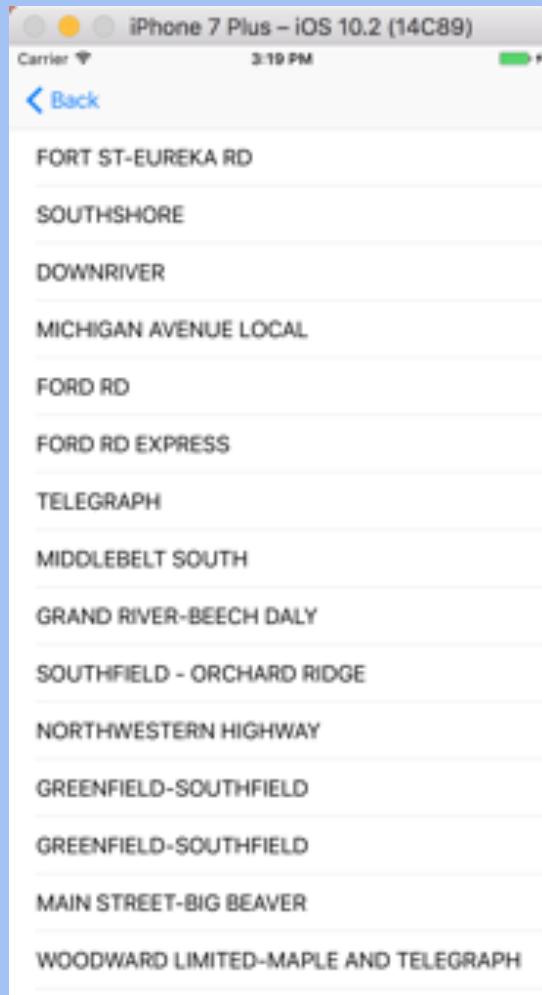
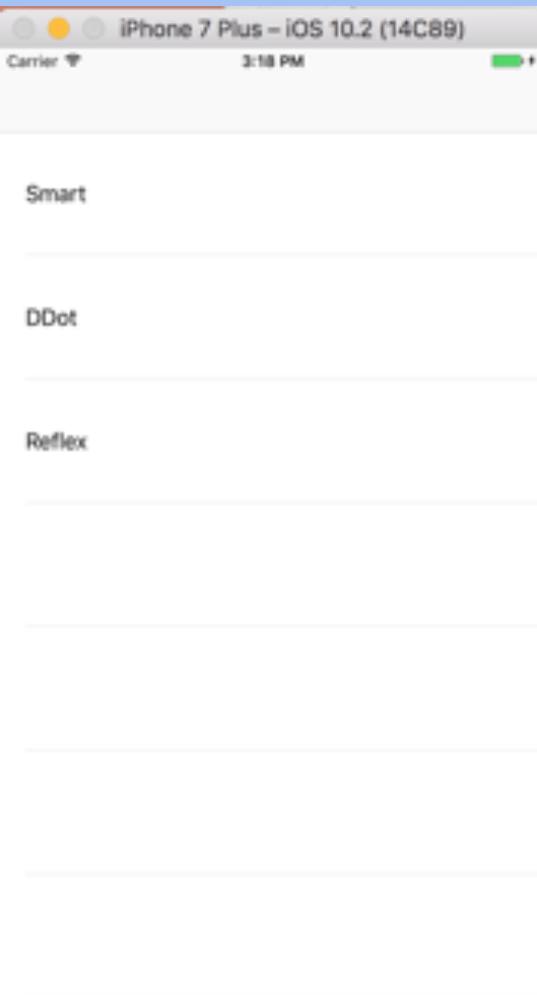
- F(ast)
- I(solated)
- R(epetatable)
- S(elf-verifying)
- T(imely) i.e. TDD not TAD

# TOOLS OF THE TRADE

- XCTest
- Cuckoo (Mocking)
- XCUI
- Postman
- Jenkins







# CUCKOO

- Add Cuckoo to the test target in Podfile
- Pod install
- Add Run Script to build phases
- Add GeneratedMocks.swift file to tests

The screenshot shows the Xcode interface with the project 'ETAMock' selected in the left sidebar. The main area displays the 'Build Phases' tab for the 'ETAMockTests' target. The 'Build Phases' section includes tabs for General, Resource Tags, Info, Build Settings, Build Phases, and Build Rules. The 'Build Phases' tab is active, showing the following phases:

- Target Dependencies** (1 item)
- [CP] Check Pods Manifest.lock**
- Compile Sources** (2 items)
- Link Binary With Libraries** (1 item)
- Copy Bundle Resources** (0 items)
- [CP] Embed Pods Frameworks**
- [CP] Copy Pods Resources**

Below these phases is a **Run Script** section. The 'Shell' field is set to `/bin/sh`. The script content is:

```
1 # Define output file; change "${PROJECT_NAME}Tests" to your test's root source folder, if it's not the default name
```

At the bottom of the Run Script section, there are two checkboxes:

- Show environment variables in build log
- Run script only when installing

```
# Define output file; change "${PROJECT_NAME}Tests" to your test's root source folder, if it's not the default name
OUTPUT_FILE="./${PROJECT_NAME}Tests/GeneratedMocks.swift"
echo "Generated Mocks File = ${OUTPUT_FILE}"

# Define input directory; change "${PROJECT_NAME}" to your project's root source folder, if it's not the default name
INPUT_DIR="./${PROJECT_NAME}"
echo "Mocks Input Directory = ${INPUT_DIR}"

# Generate mock files; include as many input files as you'd like to create mocks for
${PODS_ROOT}/Cuckoo/run generate --testable "${PROJECT_NAME}" \
--output "${OUTPUT_FILE}" \
"${INPUT_DIR}/JSONFetcher.swift"

# ... and so forth

# After running once, locate `GeneratedMocks.swift` and drag it into your Xcode test target group
```

```
func testParseRoutes() {
    let mock = MockJSONfetcher()

    stub(mock) { mock in
        when(mock.callApi(url: any(), completion: anyClosure())).
            then { url, closure in
                closure(self.testRouteJson)
            }
    }

    mock.callApi(url: url) { data in
        XCTAssertEqual(data, self.testRouteJson)
        let parser = customJSONparser(companyIndex: 1)
        let route = Route(name: "FORT ST-EUREKA RD", direction1:
            "Northbound", direction2: "Southbound", id: 1,
            routeId: "125")
        XCTAssertEqual(parser.getRoutes(fromJSONString: data),
            [route])
    }
}
```



Download  
API Blueprint

## Companies Collection

[List All Companies](#) >

### INTRODUCTION

### REFERENCE

[Companies Collection](#)

Routes Collection

Stops Collection

## Routes Collection

[Get a Companies Routes](#) >

## Stops Collection

[Get a Companies Stops](#) >



[Switch to Console](#)

Companies Collection / List All Companies

**GET** `http://ec2-204-236-211-33.compute-1.amazonaws.com:8080/companies`

### Request

Production

Raw

Try

### Response

200

#### HEADERS

`Content-Type:application/json`

#### BODY

← → × ⓘ ec2-204-236-211-33.compute-1.amazonaws.com:8080/companies/3/routes

[{"company": {"id": 3, "name": "ReflexX", "brandcolor": "#498BC5", "busImgURL": "http://ec2-204-236-211-33.compute-1.amazonaws.com:8080/assets/images/Reflex-Bus.png", "logoImgURL": null}, "companyID": 3, "routeID": "DDOT\_6455", "routeName": "REFLEX", "routeNumber": "498", "direction1": "northbound", "direction2": "southbound", "daysActive": "Weekday,Saturday,Sunday", "id": 86}, {"company": {"id": 3, "name": "ReflexX", "brandcolor": "#498BC5", "busImgURL": "http://ec2-204-236-211-33.compute-1.amazonaws.com:8080/assets/images/Reflex-Bus.png", "logoImgURL": null}, "companyID": 3, "routeID": "598", "routeName": "GRATIOT REFLEX to DETROIT", "routeNumber": "598", "direction1": "NORTHEBOUND", "direction2": "SOUTHBOUND", "daysActive": "Weekday,Saturday,Sunday", "id": 87}, {"company": {"id": 3, "name": "ReflexX", "brandcolor": "#498BC5", "busImgURL": "http://ec2-204-236-211-33.compute-1.amazonaws.com:8080/assets/images/Reflex-Bus.png", "logoImgURL": null}, "companyID": 3, "routeID": "599", "routeName": "GRATIOT REFLEX to DMC/WSU", "routeNumber": "599", "direction1": "NORTHEBOUND", "direction2": "SOUTHBOUND", "daysActive": "Weekday,Saturday,Sunday", "id": 88}]

Postman

Runner Import +

Builder Team Library IN SYNC Godfrey N... No Environment Filter

History Collections

All Me Team

ETAjson 1 request

GET http://ec2-204-236-211-33.compute-1.amazonaws.com:8080/companies/1/routes/1/Northbound/weekday/1/stops

Authorization Headers Body Pre-request Script Tests ●

Send Save Cookies Code

1 tests["Body has stopID"] = responseBody.has("stopID");  
2 tests["Body has stopName"] = responseBody.has("stopName");  
3 tests["Body has latitude"] = responseBody.has("latitude");  
4 tests["Body has longitude"] = responseBody.has("longitude");  
5  
6 var jsonData = JSON.parse(responseBody);  
7  
8 tests["The first stopID equals String 22362"] = jsonData[0].stopID === "22362";  
9 tests["The first stopName equals String METRO AIRPORT McNamara TERMINAL"] = jsonData[0]  
  .stopName === "METRO AIRPORT McNamara TERMINAL";  
10 tests["The first order equals String 1"] = jsonData[0].order === 1;

SNIPPETS

- Clear a global variable
- Clear an environment variable
- Response body: Contains string
- Response body: Convert XML body to a JSON Object
- Response body: Is equal to a string
- Response body: JSON value check
- Response headers: Content-Type header check
- Response time is less than 200ms
- Set a global variable

Body Cookies Headers (5) Tests (7/7)

Status: 200 OK Time: 105 ms Size: 1.74 KB

All Passed Failed

PASS Body has latitude  
PASS Body has longitude  
PASS Body has stopID  
PASS Body has stopName

# XCUITest

- User Interface testing
- Two options
  - Recorded tests
  - Roll your own

Choose options for your new project:

Product Name:

Team:

Organization Name:

Organization Identifier:

Bundle Identifier: com.example.Calculator

Language:

Devices:

Use Core Data

Include Unit Tests

Include UI Tests

# **XCUIS HAS 3 COMPONENTS**

- XCUIApplication
  - Launch the app
- XCUIElementQuery
  - Find the XCUI Element to test
- XCUIElement
  - Perform Test

The screenshot shows the Xcode interface with the following details:

- Project Navigator (left):** Shows the project structure for "Calculator". It includes a main "Calculator" target with a "Calculator" folder, a "CalculatorTests" target with a "CalculatorTests" folder containing "CalculatorTests.swift" and "Info.plist", and a "Products" folder.
- Editor Tab (right):** Displays the content of the "CalculatorUITests.swift" file. The code is as follows:

```
// CalculatorUITests.swift
// CalculatorUITests
//
// Created by User on 7/25/16.
// Copyright © 2016 riis. All rights reserved.

import XCTest

class CalculatorUITests: XCTestCase {

    override func setUp() {
        super.setUp()

        // Put setup code here. This method is called before the invocation of each test method in the class.

        // In UI tests it is usually best to stop immediately when a failure occurs.
        continueAfterFailure = false
        // UI tests must launch the application that they test. Doing this in setup will make sure it happens for each
        // test method.
        XCUIApplication().launch()

        // In UI tests it's important to set the initial state – such as interface orientation – required for your tests
        // before they run. The setUp method is a good place to do this.
    }

    override func tearDown() {
        // Put teardown code here. This method is called after the invocation of each test method in the class.
        super.tearDown()
    }

    func testExample() {
        // Use recording to get started writing UI tests.
        // Use XCTAssert and related functions to verify your tests produce the correct results.
    }
}
```

The "testExample()" function is currently selected in the code editor.

The screenshot shows the Xcode Test Navigator interface. The title bar indicates the project is "Calculator" and the test run is "Test Calculator : 5:52:10 PM".

The left sidebar displays a timeline of recent activity:

- Calculator Today, 5:51 PM
  - Test Today, 5:51 PM (selected)
  - Build Today, 5:51 PM
  - Build Today, 5:41 PM
  - Test Today, 5:31 PM
- Project Today, 5:51 PM
  - Debug Today, 5:51 PM
  - Debug Today, 5:32 PM

The main area shows the test results for "CalculatorUITests > CalculatorUITests". The test "testExample()" has passed, indicated by a green checkmark.

Test steps listed:

- Start Test at 2016-08-21 17:51:57.162 (Start)
- ▶ Set Up (0.00s)
- ▶ Tap "3" Button (7.19s)
- ▶ Tap "\*" Button (8.42s)
- ▶ Tap "4" Button (9.65s)
- ▶ Tap "=" Button (10.86s)
- ▶ Find the "resultsFld" TextField (12.06s)
- ▶ Tear Down (12.38s)

```
import XCTest

class ETAMockUITests: XCTestCase {

    override func setUp() {
        super.setUp()
        continueAfterFailure = false
        XCUIApplication().launch()
    }

    func testExample() {
        let app = XCUIApplication()
        let tablesQuery = app.tables
        tablesQuery.staticTexts["Smart"].tap()
        tablesQuery.staticTexts["SOUTHSHORE"].tap()
        app.buttons["Southbound"].tap()
    }
}
```

**General** Source Code Management Build Triggers Build Environment Build Post-build Actions

Project name

Description

[Plain text] [Preview](#)

Discard old builds [?](#)

GitHub project

Project url  [Advanced...](#)

This project is parameterized [?](#)

Throttle builds [?](#)

Disable this project [?](#)

Execute concurrent builds if necessary [?](#)

[Advanced...](#)

## Source Code Management

### Source Code Management

- None
- CVS
- CVS Projectset
- Git

#### Repositories

Repository URL

Credentials

- none -



[Advanced...](#)

[Add Repository](#)

#### Branches to build

Branch Specifier (blank for 'any')

[Add Branch](#)

#### Repository browser

(Auto)

## Build

### Execute shell

Command `export PATH=/sbin:/usr/sbin:/bin:/usr/bin:/usr/local/bin  
/usr/local/Cellar/node/7.8.0/libexec/npm/bin/newman run /Users/Shared/Jenkins/Desktop/ETAJson.postman_collection.json`

See [the list of available environment variables](#)

Advanced...

### Execute shell

Command `xcodebuild test -workspace ETAMock.xcworkspace -scheme ETAMock -destination 'platform=iOS Simulator,name=iPhone 7 Plus'`

See [the list of available environment variables](#)

Advanced...

# CONTACT INFO

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